

THE EFFECTIVENESS OF CREATIVE  
PROBLEM-SOLVING IN REDUCING THE  
AGGRESSION OF EMOTIONALLY HANDICAPPED  
MIDDLE SCHOOL CHILDREN

By

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Dedicated to my Parents

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The purpose of this research was to determine if training in Creative Problem-Solving could reduce the aggression of emotionally handicapped middle school children by increasing their creativity.

The sample consisted of 16 emotionally handicapped, aggressive, middle school children identified by the special education teacher as physically and verbally aggressive.

Randomized pretest-posttest control group design was used in the study. The posttest scores on creativity and aggression were dependent variables, the pretest scores were the covariates, and Creative Problem-Solving was the independent variable. The Torrance Test of Creative Thinking, Verbal Form A, and the Buss-Durkee Inventory, "motor component"

were administered to the subjects by the researcher prior to and after the treatment period. Following the administration of pretests, the subjects were randomly assigned into control and experimental groups using a random number table.

The researcher worked with the experimental subjects on Creative Problem-Solving in small groups of two or three subjects for 30 minutes daily for 15 sessions. Meanwhile the control subjects were engaged in routine special education class activities called "precision learning." To the experimental group, the researcher explained the concepts related to Creative Problem-Solving and gave the subjects practice in brainstorming on the unusual uses of familiar objects. Further brainstorming practice was given on familiar problem situations faced in school. A summary of the five-step Creative Problem-Solving process followed by a Creative Problem-Solving simulation in a story form was given. Finally, the subjects listed all the problems they faced in school that made them angry, of which they selected three to four very important problems and found solutions following the steps of Creative Problem-Solving.

The scores of control and experimental groups on creativity and aggression were analyzed using the Analysis of Covariance with pretest as covariate. Results showed that total creativity, fluency, and originality increased significantly and aggression decreased significantly. Flexibility increased but was nonsignificant. The results

strengthened the relationship between creativity and aggression and supported the view that training in CPS is an effective tool to treat emotionally handicapped middle school subjects to reduce their aggression.

## CHAPTER I

### INTRODUCTION

There is a great concern among educators over violence and vandalism by children in school (Violent Schools--Safe Schools, 1978). Educators are concerned about the excessive display of aggressive responses by school children, since it results in misbehavior, and it also could interfere with their academic performance.

The incidence of violence and vandalism is high in schools in the United States. A survey done by a committee headed by Senator Birch Bayh found that more than 100 students were murdered on school grounds in 1973 (Van Patten, 1977). According to the Safe School Study Report to the Congress by the National Institute of Education (Violent Schools--Safe Schools, 1978), surveying more than 4,000 elementary and secondary school principals between February, 1976, and January, 1977 (excluding summer months), it was found that the annual cost of school crime runs from about \$500 million to \$600 million. The major criminal actions were assaults and robberies on teachers, pupils, and others. The study revealed that about 282,000 secondary school students were attacked in a one-month period, 40% of the attacks resulting in some injury. The survey also found that 5,200 secondary

school teachers were attacked and 6,000 were robbed, with the percentage of attack declining in senior high compared to junior high, which is part of the middle school system. Both personal violence and vandalism were more prevalent in middle schools than in elementary schools.

Many psychologists believe that frustration leads to various forms of aggression. According to a popular theory of aggression in literature, the degree of aggression is a function of the frequency of frustrating events (Bateson, 1941). The close relationship between frustration and aggression is evident in the frustration-aggression hypothesis. The frustration-aggression hypothesis postulates that aggression is always a consequence of frustration (Dollard, Miller, Doob, Mowrer, and Sears, 1939). The proposition that the occurrence of aggressive behavior always presupposes the existence of frustration, and that this existence of frustration always leads to some form of aggression, explains frustration as the blocking or thwarting of some form of on-going, goal-directed behavior.

An historical account of the development of frustration-aggression hypothesis shows that an extensive use of it was made in the work of Freud. In his early writings, Freud regarded the tendency to seek pleasure and avoid pain as the basic mechanism of all mental functioning (Freud, 1933). Whenever pleasure seeking or pain-avoiding behavior was

blocked, frustration occurred. Aggression was the reaction to that state of affairs.

An everyday situation was noted by Morgan (1936) to show the effect of the accumulation of previous frustrations on aggression:

Suppose we get up in the morning with the decision that, no matter what happens during this day, we will be sweet-tempered. In spite of our determination things may go wrong. We may stub our toe, lose our collar button, cut ourselves while shaving, be unable to find the styptic to stop the bleeding, get to breakfast late and discover that the toast is burned and the coffee cold, but through all this we keep cool and even-tempered. Then some trivial thing occurs and we unexpectedly have a violent outburst. Those around us cannot understand why we are so irritable. If they knew all the facts, the repressed anger impulses that have at last gained an outlet, they would not be surprised. (p. 242)

Thus there is a need to pacify minor frustrations to reduce aggression in daily social settings. If this need is not satisfied, frustrations might pile up, leading to an outburst of aggression.

According to Dollard et al. (1939) and Berkowitz (1962), drive theories of aggression attribute aggression to the presence of specific environmental conditions (that is, frustrating events). Aggression does not occur in a social vacuum. The social antecedent of aggression that has received most attention is frustration--the blocking of on-going, goal-directed behavior.

Dollard et al. (1939) believed that there was an internal or observable instigator to an aggressive response. An instigator refers to an antecedent condition from which the aggressive response can be predicted. The instigation is a qualitative concept and the strength of instigation can be inferred from the extent to which the instigated incompatible response can overcome.

The goal-response is the reaction which reduces the strength of instigation to a degree at which it no longer has the tendency to produce the predicted behavior sequence (Dollard et al. 1939). A goal-response can terminate a predicted sequence of behavior. The termination of a behavior sequence is usually temporary and so instigation exists again and the subject is expected to perform the predicted sequence a second time. The goal-response has a reinforcing effect and is apt to be repeated as it had led successfully to the goal. But an interference with the occurrence of an instigated goal-response in the behavior sequence results in frustration. An interference may be slight or great. Expressions as "to disappoint a person," "to let someone down," and "to block somebody in carrying out an act" indicate that one person is imposing frustration on another.

A substitute-response is an action which reduces to some degree the strength of the instigation, and the goal-response of which was prevented from occurring. So a substitute

response can reduce the strength of instigation. Substitute responses occur with great frequency in the face of frustration of all kinds.

Acts of physical violence are the most obvious forms of aggression (Dollard et al. 1939). Aggression may be directed at a person or an object which is perceived as causing the frustration. A frustrated child who cannot act out his aggression directly on the cause of his frustration often displaces his aggression against some other person or object. This direct or indirect aggression is a common response to frustration and it is the expression of the child's emotional state of frustration and is one of the most noted behavior problems in the classroom.

In order to find the evidence of frustration-aggression, studies were done in the laboratory setting, where pain is the usual cue used. The subjects were insulted by a confederate of the experimenter and then they were given the opportunity to show aggression and retaliate the frustrator for the frustration induced (Buss, 1961). In a well-known study by Mallick and McCandless (1966), children in one group (the frustration condition) were prevented by a confederate from completing a series of simple tasks. The children in the second group were not thwarted (the no-frustration condition) by this person. Later, when these children from the two groups were given an opportunity to aggress against the confederate, those who had been thwarted were more aggressive



than those who had been permitted to complete the tasks. Thus, the result supported the view that frustration leads to aggression.

Thus, based on the results of laboratory studies and observations, it is reasonable to assume that aggressive behavior is traceable to some form of frustration and that reducing frustration is a step towards reducing aggression.

There are ways to reduce frustration and subsequent aggression. Various techniques are used in clinical and school settings to reduce human aggression. A discussion of these techniques is pertinent to understanding their applicability at different settings. The various techniques are:

1. Catharsis. Catharsis is "a process that relieves tension and anxiety by expressing emotions,"--emotions that have been hidden, restrained, or unconscious (Nichols and Zax, 1977, p. 1).

Catharsis has two related but separate components: (a) cognitive or intellectual, the recall of forgotten memories, and (b) physical or somatic, the discharge of emotions in tears, laughter, or angry yelling (Nichols and Zax, 1977). The cognitive-emotional aspect consists of the contents of the consciousness during the reexperiencing of an emotional event and the somatic-emotional aspect consists of the motoric discharge of emotion in expressive sounds and actions such as

tears and sobbing of grief. The cognitive-emotional aspect has two parts. They are: (1) recall, and (2) confession. The recall component is the retrieval of memories and confession is the verbal cognitive aspect.

It is common in psychotherapy for both somatic and cognitive aspects of catharsis to occur together. Clinical research literature shows that catharsis is most effective when it has both cognitive and somatic aspects. Grayson (1970) believed that the somatic component of emotional discharge can strengthen the ego sufficiently so that it enhances the patient's ability to achieve a cognitive restructuring of his experience. He combined emotionally charged cathartic mourning with the development of insight, supporting the view that catharsis is most effective when combination of somatic and cognitive aspects are used.

According to Freud, energy for death instinct is constantly being generated within the body working toward the individual's self-destruction (Ruch and Zimbardo, 1971). Freud often equated the death instinct with aggression. If this energy is not released in small amounts and in socially acceptable ways, it will accumulate and eventually be released in the form of aggression.

Cathartic approaches to anger are used in Janov's (1970) Primal Therapy and Casriel's (1972) New Identity Therapy to reduce aggression.

2. Reinforcement and Punishment. Based on Thorndike's (1930) law of effect, reinforcement and punishment are widely used in the school setting to eliminate the disruptive behavior of the children. Free-time from studies, token economy, attending to appropriate behaviors of subjects by the instructor, and praise are some of the reinforcements used (O'Leary and O'Leary, 1972). For example, Zimmerman and Zimmerman (1962) eliminated the temper tantrums such as kicking and screaming of an emotionally disturbed boy by removing the social consequences of maladaptive behavior. When the boy sat at his desk kicking, screaming, and crying, the instructor ignored the boy, and when the boy stopped those behaviors, he was praised and then the instructor worked with him. The teacher attention that the boy obtained for appropriate behavior reinforced him to be cooperative and to work for the remainder of the period.

Punishment consists of the delivery of a noxious or aversive stimulus to an organism (Buss, 1961). Both actual and threatened punishments are found to be effective in deterring various forms of human aggression (Brown and Elliott, 1965; Ludwig, Marx, Hill, and Browning, 1969; Worchel, 1957; Thibaut and Riecken, 1955). The punishment administered in the society to deter aggression is based on the assumption that if a violent person is threatened with pain and suffering, his willingness to attack fellow citizens will be held in check.

Violent people exhibiting excessive aggression have been treated by electric shock (punishment). Of course, aggressive preschool or grade school children would be treated by milder forms of punishment such as social disapproval (O'Leary, Kaufman, Kass, and Drabman, 1970), ignoring the inappropriate behaviors (Brown and Elliott, 1965) and removal of reinforcers (Brown and Tyler, 1968; Tyler and Brown, 1967).

Although several studies conducted lead to the conclusion that actual punishment may be effective in deterring various forms of aggression, it may not be always successful. If the punishment is perceived by the recipient and if the punisher serves as an aggressive model, punishment may serve to facilitate the occurrence of later aggression. Recent investigations on the impact of punishment (Campbell and Church, 1969; Fantino, 1973) suggest that punishments are effective in predicting long term changes only when administered in accordance with certain principles. The punishment must be made directly contingent upon an individual's behavior and must be administered soon after the performance of such behavior if the result is to have long duration.

3. Drug Therapy. In accordance with the physiological model of aggression, there are humans who have too much spontaneous activity in the neural systems (Moyer, 1976). This excessive stimulation results in aggressive behavior. There are a number of different kinds of aggressive behavior and

each of them has a different physiological basis. A direct control of aggression through manipulation of internal environment is possible through hormone and drug therapy (Dunn, 1941; Zimmerman, 1956; Heath and Buddington, 1967; and Kalina, 1962), though the effect is temporary and hence continued administration is required.

4. Exposure to Nonaggressive Model. Bandura's (1973) social learning theory of aggression states that witnessing aggressive models induces sharp reductions in the strength of the observer's restraints against overt aggression facilitating the occurrence of the dangerous forms of behavior. If this is true, it is reasonable to expect that exposure to nonaggressive models, who behave in a restrained nonbelligerent manner, will strengthen that behavior. A study by Baron and Kepner (1970) revealed that exposure to actions of restrained, nonaggressive models can be effective in preventing overt aggression even though the subjects are strongly instigated to such behavior.

5. Cognitive Control. Cognitive factors are important in the control of aggression (Baron, 1977). Some of the cognitive control techniques found effective in reducing aggression are information concerning the cause of another's behavior (Zillman and Cantor, 1976), one's self-statement to get over the aggressive behavior (McCullough, Huntsinger, and Ray, 1977), Rational-Emotive Therapy (Block, 1975) and

problem-solving (Goodwin and Mahoney, 1975; Spivack and Shure, 1974). The cognitive control is a method that can be successfully used to reduce frustration and diminish aggression.

Catharsis and drug therapy are used in clinical settings, whereas exposure to nonaggressive models, reinforcement, and cognitive control techniques are used in school settings. Due to the nature of cathartic technique (reexperiencing the past traumatic emotional events accompanied by somatic expression of emotion) it cannot be applied in the school settings. Also drug therapy cannot be applied in the school settings. Punishment is used in both clinical and school settings.

Many teacher-administered and externally controlled techniques such as the time out principle, punishment, teacher attention and praise to task relevant behaviors, token reinforcement program, and free time from school have been developed. These are programs for helping emotionally disturbed children control their impulses and overcome their behavioral deficits in classroom settings (O'Leary and O'Leary, 1972). Two of the limitations of these techniques include (1) the return of the behavior to the pretreatment levels after the termination of treatment, and (2) the difficulties in the administration of the programs when applied over extended periods of time (Thoresen and Mahoney, 1974).

Self-control behavior modification techniques belonging to cognitive control category have been suggested as an alternative solution to the problems of teacher-administered techniques (Thoreson and Mahoney, 1974). Using the self-control approach, children can be taught strategies to help them control their inappropriate behavior with minimal teacher intervention. Meichenbaum and Goodman (1971) suggested cognitive self-instructional procedure as a means of developing self-control. The subjects instructed themselves first overtly and later covertly when they internalized the instructions. McCullough et al. (1977) employed a self-control training program to treat a sixteen-year-old boy to control his violent unmanageable temper and emotional outbursts. Also Kenneth Block (1975) found that Rational-Emotive Therapy, which is a cognitive-control technique, can be used to reduce experimentally induced aggression of college students.

Another way to help children reduce frustration and subsequent aggression is by providing training in alternate responses to solve their problems. Training to make alternate responses is a cognitive-control technique involving creativity. That is, if children are taught problem-solving techniques for managing their aggression, there is a better chance that they will exhibit less aggressive behavior (Goodwin and Mahoney, 1975; Spivack and Shure, 1974).

"Creativity" is the ability to produce a large number of quality ideas as alternate responses. Fluency, flexibility, and originality comprise the triads of creativity which is characterized by divergent thinking (Guilford, 1959).

Schubert and Biondi (1977), reported that a large percentage of the population who repeatedly demonstrate creative behavior in dealing with day-to-day activities use a problem-solving type of creativity. Thus the coping behavior of an individual is directly related to the development of creative behavior. Hamburg and Adams (1967) proposed "new strategies" to broaden the individual's problem-solving capacity for future crises. Goldfried and D'Zurilla (1969) conducted research on the coping behavior of students at the State University of New York at Stony Brook and discussed training in problem-solving as a form of self-control training, in that an individual learns to become more effective on his own.

According to Bosse (1979), highly creative fifth-and sixth-grade students could better cope constructively with their environment compared to low creativity students of equal intelligence. Highly creative students seemed calm and aloof from classroom routine, more alert and aware, and seemed to have developed work habits that allowed them to finish work more rapidly than students with high IQ and low creativity. Bosse found that creative students presented a picture of efficient workers who were socially mature and able to cope with frustration.



Dalton (1973) investigated the effects of five levels (low, moderately low, moderate, moderately high, and high) of hostility to three dimensions of the Torrance Tests of Creative Thinking and found that subjects who were classified as highly hostile scored significantly lower ( $P < .01$ ) on the fluency, flexibility, and originality measures of creativity, establishing a relationship between hostility and creativity.

Schroder and Rotter (1952) demonstrated that "non-rigidity or flexibility was a kind of higher-level behavior which consists of expecting change and looking for alternative pathways." Also, Kandil and Torrance (1978) found that socially and emotionally disturbed children are high in fluency and originality but low in flexibility scores. So they suggested deliberate programs to make use of the subjects' strengths to improve their flexibility and develop coping skills or behavioral adjustment.

Creative Problem-Solving (CPS) is a cognitive control technique which has been shown to improve fluency, flexibility, and originality of the subjects involved in it (Parnes, 1967a, 1971).

A striking illustration of the effects of Creative Problem-Solving programs on coping behavior was presented by Parnes (1971) in the following excerpt from the letter of a man who was involved in Creative Problem-Solving courses for several years:

Over the years I have made a connection for myself between the conscious awareness of one's creative potential and mental health. You are probably aware that I have made many other connections to CPS as well, but this particular one I have never discussed. It is really quite simple: by being able to solve many of the minor problems with which I am confronted through conscious effort on my part, I continually strengthen my own belief that I am able to exercise control over my immediate environment. It helps keep me aware that I do in fact have control over a large portion of my future and in time when cause and effect are often so many steps removed from one another, it helps me reduce differences to a lower common denominator enabling me to better cope. . . . (pp. 27-28)

In the present study, Creative Problem-Solving was used with emotionally handicapped middle school children to reduce their frustration and diminish their aggression. Withdrawal, noncooperation, impulsiveness, and aggression constitute the personality dimensions of emotionally handicapped children (Bullock and Brown, 1972). A large portion of the behavior that is labelled as "emotionally disturbed," leading to the placement of those children in special education classes, consists of aggressive activity. It was found that the majority of emotionally handicapped boys were in trouble because of their aggressive behavior (Giebink, Stover, and Fahl, 1968).

There are several slumps in creative thinking in the developing child (Torrance, 1967). The biggest slump occurs at fourth grade. Therefore, students older than grade four

were thought to be better candidates for CPS training. Many students at middle school (between the fifth and eighth grades) were having problems with aggression. Therefore, the middle school age was thought to be a good age to teach creativity to decrease aggressive behavior.

### Research Questions

1. Is Creative Problem-Solving effective in increasing creativity of emotionally handicapped middle school children?

1(a). Is Creative Problem-Solving effective in increasing the fluency of emotionally handicapped middle school children?

1(b). Is Creative Problem-Solving effective in increasing the flexibility of emotionally handicapped middle school children?

1(c). Is Creative Problem-Solving effective in increasing the originality of emotionally handicapped middle school children?

2. Is Creative Problem-Solving effective in reducing the aggression of emotionally handicapped middle school children?

### Hypotheses

It was hypothesized that emotionally handicapped middle school children with aggression problems would diminish their aggression score if they were able to increase their creativity through practice in Creative Problem-Solving.

The statistical hypotheses stated for this study were as follows:

1. Emotionally handicapped middle school children with aggression problems, who practiced Creative Problem-Solving techniques, manifest more creativity compared to similar school children who did not practice Creative Problem-Solving as measured by the Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words").

1(a). Emotionally handicapped middle school children with aggression problems, who practiced Creative Problem-Solving techniques, manifest more fluency compared to similar school children who did not practice Creative Problem-Solving as measured by the Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words").

1(b). Emotionally handicapped middle school children with aggression problems, who practiced Creative Problem-Solving techniques, manifest more flexibility compared to similar school children who did not practice Creative Problem-Solving as measured by the Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words").

1(c). Emotionally handicapped middle school children with aggression problems, who practiced Creative Problem-Solving techniques, manifest less aggression compared to similar school children who did not practice Creative Problem-Solving as measured by the Torrance Test of Creative

Thinking, (Verbal Form A, titled "Thinking Creatively with Words")).

2. Emotionally handicapped middle school children with aggression problems, who practiced Creative Problem-Solving techniques, manifest less aggression compared to similiar school children who did not practice Creative Problem-Solving as measured by the Buss-Durkee Inventory, "motor component."

#### Definition of Terms

1. Aggression. In this study aggression was defined as acts such as fighting, kicking, beating, calling names, talking back to teachers, yelling, screaming, and lying.

Physical aggression was defined as fighting, kicking, beating, etc., and verbal aggression was defined as yelling, screaming, lying, calling names, and talking back to teachers.

Aggression was operationally defined in terms of a single score on four of the subscales of the Buss-Durkee Hostility-Guilt Inventory (Buss and Durkee, 1957). The four subscales--Assault, Indirect Hostility, Irritability, and Verbal Hostility--comprise a factor analytic "motor component" called "aggression" (Sarason, 1961).

2. Creativity. In this study creativity was defined as the ability to postulate a number of original and different categories of ideas as solution to problems. Creativity consists of fluency, flexibility, and originality, all of which involve "divergent" thinking (Guilford, 1959).

Fluency was defined as the number of acceptable responses, flexibility as the number of shifts or transformations in response categories, and originality as statistical infrequency. Divergent thinking was the ability to produce a lot of quality ideas to make alternate responses. Thus creativity was characterized by divergent thinking.

Operationally, creativity was defined as what the Torrance Test of Creative Thinking, Verbal Form A, titled "Thinking Creatively with Words," measures.

3. Creative Problem-Solving (CPS). CPS is a five-step scientific process. The steps are fact-finding, problem-finding, idea-finding, solution-finding, and acceptance-finding.

4. Emotionally Handicapped Student. They are the subset of all emotionally handicapped subjects who are identified by the Alachua County Procedures for Providing Special Education for Exceptional Students, 1980-'81, (School Board of Alachua County, Florida, p. 72) as physically and/or verbally aggressive.

#### Basic Assumptions Underlying the Study

1. Creative Problem-Solving is a cognitive-control technique.

2. The general effectiveness of Creative Problem-Solving may be most efficiently facilitated by training individuals in general procedures or skills that would allow

them to deal independently with the critical situations that confront them in day-to-day living.

3. Creative Problem-Solving is a skill that can be learned by practice.

4. Creative Problem-Solving can be taught in a short period.

5. Creative Problem-Solving can be learned by the emotionally handicapped school children.

#### Significance of the Study

The present study is significant because it could lead to a better understanding of Creative Problem-Solving as a way to reduce aggression of emotionally handicapped aggressive school children. Training of emotionally handicapped subjects in Creative Problem-Solving could increase their creative abilities to produce a number of quality ideas that lead to solutions to problems. Thus, the subjects can use this skill to meet future challenges creatively.

This study could teach children that Creative Problem-Solving is appropriate, functional, exciting, and humanizing in many situations. Thus, the study might result in strong motivation to utilize one's creative potential. This could develop a consciousness of the vital importance of creative effort in all walks of life. This could also develop a heightened sensitivity of the problems that surround oneself--an attitude of "constructive discontent" towards situations

as they exist in one's life, that is, a constant desire to improve everything that one does. This study might also add more knowledge to the belief that creativity is related to psychological health.

This study is further significant because its results could have implications in training teachers, counselors, and others working with children. If Creative Problem-Solving is found to be effective in increasing creativity and reducing aggression of emotionally handicapped middle school children, it can help in making changes in the curriculum of the teachers' training programs and the curriculum of the special education classes for the emotionally handicapped.

#### Limitations

In conducting this study several limitations were recognized. An important limitation of the study was that the actual aggressive behavior of the children (frequency counts of aggressive behavior) was not observed before or after the program. Rather, the children were identified as aggressive by their teachers.

Secondly, the subjects in the study were not randomly selected from a population of emotionally handicapped aggressive children; so the generalizability of the results is limited.

The third limitation of the study was that the treatment was conducted in small groups of two or three subjects. Though Torrance and Myers (1970) believed that Creative



Problem-Solving was effective for disadvantaged children, in small groups from four to six subjects, keeping the emotionally handicapped aggressive children on the task in groups of two or three was difficult enough.

The fourth limitation of the study was that an attention control group was not used in the study to see if the significant results were due to CPS or to the attention the experimental subjects received from the researcher.

Finally, the treatment was only for 15 sessions of 30 minutes. Out of 15 sessions, the first seven sessions were spent familiarizing the subjects with the concepts and various aspects of Creative Problem-Solving. Only eight sessions were spent on the actual Creative Problem-Solving of the real problems they face at school.

#### Delimitations

The present study was limited to 16 emotionally handicapped public school children attending a middle school in Florida. The subjects were attending special education class for the emotionally handicapped and were identified by their teachers as aggressive on the basis of their physical and verbal aggression. The study was also limited to those emotionally handicapped students who were cooperative and who had their parents' consent to participate in the study.

Another delimitation of the study was that it was limited to paper and pencil tests of creativity and aggression. The

creativity test used in the study was limited to the Torrance Test of Creative Thinking, (Verbal Form A) and the aggression scale used was limited to 43 items which comprise the "motor component" of hostility from the Buss-Durkee Inventory.

### Organization of the Study

This study is organized into five chapters. Chapter I includes the research question, statement of hypotheses, definition of terms, basic assumptions of the study, significance of the study, limitations, and delimitations. Chapter II contains a review of literature pertaining to Creative Problem-Solving and its effects on creativity and aggression. Chapter III describes the sample, the researcher, the experimental design, instrumentation, administration, and scoring of the instruments, treatment, data collection, and statistical analysis of the data. Chapter IV reports the results and their significance for each hypothesis. Chapter V is a discussion of the results, problems in the study, suggestions for future research, implications, summary, and conclusion.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

The review of related literature falls under three subheadings. The first part deals with the concept of Creative Problem-Solving, explaining the steps involved in the process. The second part deals with the effectiveness of CPS on creativity. The third part deals with the effectiveness of CPS on aggression. The literature on the effectiveness of CPS on creativity and aggression falls under descriptive studies, experimental studies, and anecdotal reports.

#### The Concept of Creative Problem-Solving

Creative Problem-Solving was first originated by Osborn (1957) and further developed by Parnes (1967a). Torrance, Bruch, and Torrance (1976) believed that the Osborn-Parnes Model of Creative Problem-Solving is ideal for use because it is flexible and can be applied to any problem or subject matter. They also believed that it can be taught at any age from kindergarten through graduate and professional schools. It is particularly effective in developing the abilities which seem to be required in solving problems in real life.

Creative Problem-Solving is a process involving creativity. It can be defined as a thinking process which is scientific:

"Creative thinking . . . takes place in the process of sensing difficulties, problems, gaps in information, missing elements, making guesses, or formulating hypothesis about these deficiencies; testing these guesses and possibly revising and retesting them; and finally in communicating the results" (Torrance, 1965, p. 8).

Creative Problem-Solving is a five-step problem-solving technique to help make adjustments in all walks of life. People need to use their creative power in their studies, jobs, or even in being a good mother and housewife. Parnes (1977) describes Creative Problem-Solving as an:

. . . innovative alternation between imagination and judgement in each of five steps toward creatively handling a situation or meeting an objective: Fact-Finding, Problem-Finding, Idea-Finding, Solution-Finding, and Acceptance-Finding. It is only one way of talking about or diagramming the very amorphous process of discovering new and relevant associations among the vast data in our brains toward the resolution of our concerns, problems, and challenges. (p. 4)

The five steps of Creative Problem-Solving are (Torrance and Myers, 1970; Parnes, Noller, and Biondi, 1977):

Step 1. Sensing Problems and Challenges (Fact-Finding).

The first step in CPS is to become sensitive to gaps in knowledge and missing elements and sense problems and challenges. That is, one has to become aware of the fact there are problems. Parnes called this situation a "big mess." At this step, an individual has to ask questions to find out what the basic objectives are and find additional facts.

Step 2. Definition of Problem (Problem-Finding).

Using additional facts, synthesize the "big mess" and redefine the problem. Change the wording of the statement of the problem and finally break it down into subproblems.

Step 3. Producing Alternate Solutions (Idea-Finding).

In Creative Problem-Solving, idea production by brainstorming is extensively used and is recognized as the most important part. Brainstorming is a method that is useful to imagine lots of new ideas to help solve a problem (Noller, Treffinger, and Houseman, 1979). Osborn's (1963) brainstorming has four basic rules. They are:

1. Criticism is ruled out until later. Adverse judgement of ideas must be withheld until later.
2. "Free-wheeling" is welcomed. The wilder the idea, the better; it is easier to tame down than to think up.
3. Quantity is wanted. The greater the number of ideas, the more the likelihood of useful ideas.
4. Combination and improvement are sought. (p. 156)

A list of idea spurring words are used to enlarge the storehouse of ideas during brainstorming (See Worksheet No. 3, Appendix A).

Step 4. Evaluating Ideas (Solution-Finding).

When deferred judgement is used in idea-production, all kinds of ideas are produced and their evaluation is a major task. To select the best idea, it is necessary to select

criteria to weigh or measure the ideas. Objective standards for selecting criteria are cost, time required, usefulness, practicality, social acceptance, and other considerations. Each and every idea is judged by each criterion and scores are given on a three point scale, where 1 represents poor, 2 represents fair, and 3 represents good. The scores for each idea are added across the rows and the ideas with the highest score are selected.

Step 5. Preparing to Put Ideas Into Use, That is, preparation for selling the programs (Acceptance-Finding).

After a promising idea has been found, there is a challenge to make it acceptable. In order to implement the ideas, changes may be necessary. This may include tailoring the idea for special groups to make it attractive and gain their acceptance. The subject should also plan to whom, when, where, and how to implement the idea.

The component skills involved in Creative Problem-Solving are identification of the problem, which falls in Step 1 and Step 2; brainstorming, which comes mainly in Step 3; selection of criteria, which comes in Step 4; evaluation of the solution to problem, which is part of Step 4; and selling the program to others, which comes in Step 5.

#### The Effect of Creative Problem-Solving on Creativity

Research on the development of creative behavior increased after the Presidential address of J. P. Guilford in 1950 to

the American Psychological Association. At the 1959 University of Utah Research conference on the Identification of Creative Scientific Talent, a committee was appointed to report on the "Role of Educational Experience in the Development of Creative Scientific Talent" (Taylor, 1959). The Committee reported that at least six research projects had indicated that creative productivity can be developed by deliberate process. No research report at that time was inconsistent with this view.

Many creative thinking workbooks, workshop leaders, and course instructors present exercises intended to strengthen basic abilities which underlie creative potential, with the assumption that these abilities will become stronger with practice in the same way that learning multiplication tables, playing a violin, solving chemistry problems, or writing a correct sentence will improve with practice (Skinner, 1972).

Parnes and Brunelle (1967) researched over 40 studies for teaching students to improve their sensitivity, fluency, flexibility, originality, elaboration, and related abilities. Approximately 90% of the total number of studies indicated that subjects' creative-productivity levels were increased by those educational programs. Based on the results of those studies, deliberate educational programs for creativity appears to be promising.

Several programs, described below, have been designed to increase creativity at various educational levels:

The Purdue Creative Training Program (PCTP) (Feldhusen, Treffinger, and Bahlke, 1970) consisted of 28 video-taped presentations, each accompanied by printed exercises for the development of creative thinking and problem-solving abilities. The presentation focused on the stories of historical persons and famous events in history. The exercises provided were to develop the use of fluency, flexibility, and originality in writing and drawing. This program was found to be effective in fostering creative thinking, problem-solving and the related attitude among the elementary school children.

The Productive Thinking Program (PTP) (Covington, Crutchfield, Davies and Olton, 1972) was a programmed instructional sequence consisting of 16 units designed to foster creative problem-solving abilities and related attitude among fifth and sixth graders.

Treffinger, Speedie and Brunner (1974) used PCTP and PTP in an experimental study to find out if creative thinking and problem-solving abilities of elementary school children can be improved through direct educational effort. The results of the study indicated that divergent thinking abilities, especially verbal abilities, were significantly enhanced by instruction with PCTP or PTP.

LaBelle (1974) used Torrance and Myers' (1970) version of Creative Problem-Solving in nursing education so that nurses can be more effective by making alternate responses to



alleviate the patients' suffering. Torrance (1964) started a three-year Creative Problem-Solving program for nursing students.

Torrance (1972) summarized the results of 142 studies designed to test approaches to teaching children to think creatively and reported the highest percentage of success in programs that emphasize the Osborn-Parnes Creative Problem-Solving and/or modifications. Osborn-Parnes Creative Problem-Solving consists of the five steps of finding a solution to a problem emphasizing the deferred judgement principle. Ninety-one percent of the experiments using combinations of techniques based on the Osborn-Parnes training program achieved success. These studies ranged from kindergarten and first grade through college and professional education. Some of those studies are summarized as follows:

Khatena (1971) taught 118 disadvantaged preschool children between five and six years of age the strategies of divergent thinking as measured by the Torrance Tests of Creative Thinking, (Figural Forms) by giving them activities to reorganize various pictures. The Solomon four-group design was used to avoid confounding variables, to obtain strong results, and avoid the possibility of Type I error. The analysis of variance of the posttests showed significant main effect for the experimental group for fluency, flexibility, originality, and elaboration suggesting that disadvantaged children at preschool can be taught to think creatively with everyday

learning materials. In this study, the Figural Forms of TTCT, which was appropriate for the disadvantaged preschool children was used.

Cartledge and Kauser (1963), designed an experiment to stimulate creativity in first-grade children who scored lowest on the screening test of creativity. One-hundred twenty-eight subjects from two schools who scored the lowest in creativity were randomly assigned into control and experimental groups. The author found that experimental group that received five 20-minute training sessions to improve a toy dog based on Osborn's principles produced superior average creativity score ( $P < .01$ ) compared with no training.

Rouse (1967) compared 47 educable mentally retarded children (ages between 7 years 7 months to 17 years 2 months), enrolled in special education classes, who received lessons to enhance creative thinking, with 31 retardates who did not receive the lessons. The treatment was 30 consecutive lessons of 30 minutes each covering a wide range of activities such as brainstorming, drawings, writings of stories, and the composition of poems. Results showed significant improvement for the experimental group in fluency, flexibility, originality, and elaboration.

Sullivan (1969) used brainstorming and Creative Problem-Solving on 25 slow learning elementary students based on the belief that all children are creative. All problems were presented by the teacher in a manner that demanded divergent

thinking. The results showed a considerable increase in the slow learners' "verbal-creative" ability.

The Creative Problem-Solving technique was used in the Interscholastic Future Problem-Solving Bowl for gifted grade school children. An evaluation of that program (Torrance, 1978) showed that the effects on creativity were encouraging.

Creative Problem-Solving was successful, not only with children, but also with college and professional students in increasing creativity. The faculty at St. Mary's School of Nursing tried to offer a Creative Problem-Solving program which would develop each student's thinking abilities and skills as each nurse is continuously confronted with problems of which she is vaguely aware. The program gave the subjects 30 tasks calling for the production of divergent solutions, multiple possibilities, and other types of thinking involved in creative behavior during the 3-year diploma program. The subjects were tested at the beginning of the freshman year and near the end of the psychiatric nursing experience in the senior year. The seniors were divided into three groups, but they all took the posttests at the eighth week in psychiatry. Torrance found that the mean scores of ideational fluency, flexibility, originality, and elaboration of the nursing students were higher for the seniors than for the freshmen, and this difference was accepted with high degree of confidence ( $P < .005$ ). There was no control group of similar students not participating in the nursing education program.

So the effectiveness of this particular deliberate Creative Problem-Solving program might be argued.

Parnes (1967c) used three groups of high school seniors, one group taking Creative Problem-Solving training with the instructor, the second group taking the programmed instruction in Creative Problem-Solving, and the third group serving as the control group, receiving no training between pre and posttests. Each group consisted of 62 subjects randomly selected from the public schools of Buffalo, New York, and matched on the basis of IQ. Six different schools were used to prevent contamination--to eliminate discussion between groups. But "in-the-same-school" control groups were used for comparison. A battery of eleven psychological tests were given to all three groups as pretests and posttests. Between the pretests and posttests, the two experimental groups met twice a week during the entire semester for the training. Both instructor-taught and programmed methods produced superior creativity, compared to the control groups, strengthening the effectiveness of CPS on creativity. The tests most representative of the outcome were Planning Elaboration, Product Improvement Fluency, and Product Improvement Flexibility, Alternate Uses, Other Uses, Product Improvement Originality, and Consequences Total. Instructor-taught groups tended to be more markedly and consistently superior to the control groups than program-taught students who had no instructor. The presence of the instructor might have made the course more interesting,

so the instructor-taught group felt that they gained more from it.

Shean (1979) found that Creative Problem-Solving training workshop for students of school administration for ten hours increased fluency, flexibility, and originality of experimental students significantly.

By looking at the results of a number of studies conducted at various educational levels where Creative Problem-Solving or its modifications were used, one can conclude that they are effective in increasing creative abilities.

According to Dalton (1973), there is a negative relationship between the level of hostility and the level of creativity. That is, high level of hostility is related to low level of creativity. Thus, it is pertinent to look at the effect of Creative Problem-Solving on personality variables, especially the level of aggression.

#### The Effect of Creative Problem-Solving on Aggression

Only a few investigators have attempted to study changes in personality as a result of experimental courses in Creative Problem-Solving. Changes in the direction of creative personality were evident in most of these studies, but these changes were not as impressive as the changes in ability factors of creativity.

Research conducted by Meadow and Parnes (1959), used eleven batteries of tests. One battery of ten tests revealed

a substantial improvement in personality traits as well as in creativity. Personality tests were given to 162 college students before and after the treatment. The treatment, which was a creative thinking and problem-solving course, was extended throughout the semester. Fifty-four students who had taken the course were compared with two other groups of the same size comprised of comparable students who had not taken the course. The subjects were matched on age, sex, and intelligence quotient. The subjects in the course were instructed to solve problems by postponing judicial evaluation of the solution based on Osborn's principles. The graduates of the problem-solving class attained significant increments on five of seven measures of creative ability and a significant increment on the California Psychological Inventory Dominance Scale. Thus Meadow and Parnes found that Creative Problem-Solving course produces a significant increment on certain ability measures associated with practical creativity and on the personality variable. Meadow and Parnes conducted studies using regular college students, and their studies did not focus on the problem of aggression.

Yee (1965) used the instructional materials derived from a course in Creative Problem-Solving offered at the University of Buffalo and studied its effects and personal-social adjustment upon creativity of twelfth grade students. The first and second administration of the Minnesota Tests of Creativity and the California Test of Personality were

administered to control groups with a five week period between each administration. Their tests were administered to the experimental group before and after they received instruction in Creative Problem-Solving. The instruction in Creative Problem-Solving resulted in significantly greater creativity test scores. High ability (high IQ) students showed a significant increase in creativity test scores after Creative Problem-Solving instruction as compared to students similar in ability who did not receive instruction. Low ability (low IQ) students who received instruction did not increase their creativity test scores significantly as compared to students of similar ability who did not receive instruction, though the increase approached .05 percent level of significance. Significant relationships were found between certain personal adjustment traits on California Test of Personality and creativity test scores of the Minnesota Tests of Creativity. Creative high ability students were found to have significantly greater sense of personal worth and fewer antisocial tendencies than their counterparts who were similarly creative but who possessed low ability. Yee found that Creative Problem-Solving improved school adjustment of the subjects by reducing antisocial tendencies suggesting it might reduce aggression.

Robin, Schneider, and Dolnick (1976) treated eleven emotionally disturbed aggressive elementary children using the Turtle Technique (Schneider, 1974) to reduce their aggression. Turtle Technique is a promising procedure to

help children control their impulses toward aggressive behavior. This technique makes use of the image of the turtle which withdraws into its shell when provoked by its external environment. Young children are taught to react to impulses to aggress by (a) imagining that they are turtles withdrawing into their shells, pulling their arms close to their bodies, putting their heads down, and closing their eyes; (b) relaxing their muscles to cope with emotional tension; and (c) using social problem-solving to generate prosocial alternate responses.

The subjects in the study were trained for 15 minutes daily in the three phases of the technique--the turtle response, relaxation, and problem-solving. They also listened to the story of a little turtle who learned to withdraw into his shell until he was no longer angry. Throughout the regular class periods the teacher cued the children by calling out "turtle" whenever she saw an incipient fight. Reinforcement and peer support encouraged the subjects to "do turtle" at appropriate times. While "doing turtle" the subjects learned to relax by releasing tension in the various muscle groups. During the final phase, the subjects learned to do problem-solving consisting of role playing and discussion aimed at teaching the children alternate strategies to cope with problematic situations. Multiple baseline design which is a powerful design was used where each group served both as control and experimental group, but the control and the



experimental period was different for the groups. Thus group A received two weeks of baseline followed by eight weeks of treatment and group B received seven weeks of baseline followed by three weeks of treatment. One group received training for 8 hours and 45 minutes, and the other group received training for 3 hours and 45 minutes.

Observations of the children's aggressive behavior were taken as a measure of the effect of the Turtle Technique. The mean weekly rates of aggression for subjects in group A revealed that the rate of aggressive behavior decreased from a mean of 20.5 during baseline to a mean of 12.0 during treatment ( $P < .001$ ). The rate of aggressive behavior in classroom B decreases from a mean of 4.9 during baseline to a mean of 2.7 during treatment ( $P < .01$ ). The aggressive behavior decreased from baseline to treatment for every child.

Robin et al. (1976) integrated contingency management, turtle response with relaxation, and problem-solving into a unified treatment to treat the subjects. The results showed reduction in aggression during treatment, greater reduction with longer treatment as measured by observation. This study suggests further research to find the effectiveness of the part played by each component of treatment.

Loughmiller (1968) found that group problem-solving was an effective method to help control the excessive expression of aggression using adolescent boys in a therapeutic summer camp for emotionally handicapped. Two counselors worked with

the campers in groups of nine. In the camp, the policy was to take care of a problem as it arose and clear the air. When a conflict occurred which prevented the group from obtaining its immediate goals, the group sat together and got to the bottom of the problem without complicating the matters by aggressive outbursts. Thus they immediately started group problem-solving. The boys got the cues to solve the problem from the counselors and from the discussion. They learned from the counselors and other members of the group that there are ways to solve a problem rather than showing their frustrations or hostility. At the end of the summer camp it was found that the boys were less aggressive.

Loughmiller did a descriptive study of the effectiveness of group problem-solving on the aggression of emotionally disturbed children. He used a group problem-solving technique in which the counselors and the group members discussed the problem and helped the members to find a solution to a conflict which prevented the group from obtaining its goals. It was not a scientific study using control and experimental groups under controlled conditions, but the study has implications for future research to do experimental studies for finding the effectiveness of problem-solving on aggression under controlled conditions.

Teaching a person how to solve a specific problem has been found somewhat effective in changing behavior. Giebink, Stover and Fahl (1968) taught six, ten to twelve-year-old

impulsive boys alternative adaptive ways to handle frustrating situations. The boys were randomly assigned into control and experimental groups of three each. The control boys and experimental boys were presented with commonly occurring frustrating situations. The boys in the experimental condition were instructed in five alternative adaptive responses for each of the four situations presented to them. The boys who received instructions for a week (the number of hours is not specified) to improve their ability in handling frustrating situations improved more than the boys who did not receive instructions, as measured by verbal responses to questionnaire. The mean number of adaptive responses increased from 8.8 to 10.2 and the inappropriate responses decreased from a mean of 3.2 per child to a mean of 1.2.

The study by Giebink et al. (1968) suggested the degree of specificity in employing cognitive approach to modify unacceptable behavior. The study was conducted under experimental conditions, but due to the small number of subjects (six children), no statistical analysis was done. Also, the effectiveness of the result might have been greater if the study had been carried on over a greater length of time than one week period.

Perhaps anecdotal evidence support the hypothesis that aggression can be reduced by creative ways of teaching (Torrance and Myers, 1970; Torrance and Hall, 1980). Torrance first collected data concerning teaching miracles from a

class he taught in 1964 at the University of California at Berkeley. He called the dramatic changes in students' attitudes "miracles." He asked 200 experienced teachers in his class on "Creative Ways of Teaching" to try to recall instances in which they encouraged children, young people, or adults in their teaching to become involved creatively and found that experience made a real difference in achievement and behavior. A group of 165 exceptionally creative teachers from those 200 teachers were able to recall instances where encouraging creativity of bitter, sarcastic, and hostile youngsters transformed their negative feelings into positive creative energy such as kindness and success, and children turned from well-established patterns of vandalism, destructiveness, and lack of school achievement to productive altruistic behavior. Also, emotionally disturbed and unproductive behavior changed to constructive behavior and outstanding achievement. Similarly, fighting and uncommunicativeness of kindergarten children who communicated with their fists showed improved speech as a result of the imagination, planning, and problem-solving in their project. These pieces of information suggest the relationship between creativity and adjustment of school children and the necessity for improving their creativity.

The review of related literature in the area of the effectiveness of Creative Problem-Solving on creativity and aggression suggests that there exists a link between creativity

and aggression. But there was not a single scientific study in which Creative Problem-Solving was used as treatment to see if aggression can be reduced in order to help the subjects solve their problems creatively. Also, Creative Problem-Solving was not applied to emotionally handicapped subjects previously.

### Summary

The concept of Creative Problem-Solving as pictured by Osborn and Parnes was depicted in the early part of the review of related literature. The literature further revealed that deliberate programs have been designed at various educational levels to promote creativity. The Osborn-Parnes model of Creative Problem-Solving and its modifications produced the highest percentage of success in increasing creative abilities as opposed to other programs designed to promote creativity. There are descriptive, experimental, and anecdotal studies in the literature, suggesting a close relationship between creativity and aggression. But no systematic study yet has been conducted on emotionally handicapped subjects using Creative Problem-Solving as the treatment variable to reduce their aggression, hence the necessity for this study.

## CHAPTER III

### METHODOLOGY

The review of related literature has shown that the Osborn-Parnes Model of Creative Problem-Solving and its modifications have been successful in promoting creativity. A few studies suggested a link between creativity and aggression. In Creative Problem-Solving, subjects learn to make alternate responses in order to find solutions to their problems. So CPS should be effective in reducing aggression. But there has been no previous study conducted in which Creative Problem-Solving was used as the independent variable to reduce aggression. Also CPS has not been studied systematically with emotionally handicapped subjects. Thus, the present study was a pioneer work to train emotionally handicapped subjects in CPS in order to reduce their aggression by increasing creativity in finding solutions.

#### The Sample

From a pool of 27 emotionally handicapped middle school children attending special education class, 23 children who showed excessive physical and verbal aggression identified by their teacher were selected for the study. Three subjects did not receive parent consent to participate in the study

and were eliminated from the study. Three other subjects, who received the consent early were assigned to a pilot study one week prior to the actual program to familiarize the researcher with the procedures and the unexpected problems.

Subjects were randomly assigned into control and experimental groups. Of 17 subjects in control and experimental groups, one was eliminated from the control group and from the study because he was suspended from school toward the end of the study. Thus, the sample consisted of 16 emotionally handicapped aggressive middle school children. There were four black and twelve white students in the sample, with an average age of 13.30 and average IQ of 88.4. The subjects ranged in grades from five through eight. There were two girls and fourteen boys in the sample, with six boys and two girls in the control group and eight boys in the experimental group.

All subjects in the study attended a special education class for emotionally handicapped students. Their regular program consisted of a precision teaching plan used for mathematics and reading. The students learned vocabulary words, finding words from the dictionary with their definitions and meanings. They copied words on the chalk board and wrote them five times and learned them for a test at the end of each week. Reading instruction was given to those who were low in reading comprehension. The students were also given practice in the basic mathematics skills such as

addition, subtraction, multiplication, and division. It was the practice in this class to reinforce the subjects by tangible rewards for their good performance and cooperation.

### The Researcher

The researcher was a graduate student in the department of Foundations of Education, University of Florida. She had a five-hour credit graduate course in creative thinking which included classroom instruction and exercises in Creative Problem-Solving.

### The Experimental Design

A randomized pretest-posttest control group design was used in the present study (Campbell and Stanley, 1966),

$$R \quad O_1 \quad X \quad O_2$$

$$R \quad O_1 \quad - \quad O_2,$$

where O = test, X = treatment, and R = random assignment.

In this study, the posttest scores on creativity and aggression were the dependent variables, the pretest scores on creativity and aggression were the covariates, and the Creative Problem-Solving was the independent variable. The covariates were used to reduce error variance in the analysis and thus increase the power of the analysis.

### Instrumentation

1. The Buss-Durkee Inventory (Buss and Durkee, 1957).

This Inventory is a scale of aggressiveness developed on the



basis of frustration-aggression hypothesis. So it involves the selection of test stimuli logically related to that theory. The test items selected were based on the classification of different types of aggressive responses. Because of its theoretical orientation, the content validity of the scale is clearly defined and it seems to have potential as a meaningful measure of aggressiveness. Also the authors emphasized the internal consistency of the scale. The items with an internal consistency of .40 or greater were selected by correlating each item with the score of the scale in which it belonged.

On the Inventory, hostility and aggression fall into seven subscales. There are two kinds of hostility (resentment and suspicion) and five kinds of aggression (assault, indirect hostility, irritability, negativism, and verbal aggression). A guilt subscale was also added to the Inventory as the eighth subscale. The Buss-Durkee Inventory consists of 75 items--66 items for hostility and aggression and 9 items for guilt. There are 60 true items and 15 false items, a ratio of four to one, to reduce the effect of response sets.

The authors of the Inventory were aware that social desirability might influence the test responses, so they attempted to minimize the variable of social desirability by: (a) assuming that anger was present and inquiring only how it was expressed; (b) providing justification for admitting

aggressive acts; and (c) including cliches and idioms that would find ready acceptance (Buss and Durkee, p. 345). A low correlation of .27 for college men and .30 for college women obtained between social desirability and the probability of endorsement of the items on the Inventory reflects the success of the item construction.

Buss-Durkee subjected the subscales to a factor analysis and found that they were loaded on two factors on the basis of content. One factor is an attitudinal component of hostility (resentment and suspicion) having to do with the attitude that involves negative labels and the other factor is a "motor component" (assault, indirect hostility, irritability, and verbal hostility). Guilt and negativism did not fit too well on the factors (Buss, 1961).

The Buss-Durkee Inventory (Factor A) consists of five subscales--assault, indirect hostility, irritability, verbal hostility, and negativism. In this study, a single index of aggression, combining 43 items of the four subscales of Buss-Durkee (Factor A) was used to measure aggression as a undimensional variable. Thus, the Buss-Durkee "motor component" consists of assault, indirect hostility, irritability, and verbal hostility.

The factor analysis indicated that Factor A (aggression) and Factor H (hostility) remain invariant across different groups of male subjects, but there was little stability for females. The test-retest reliability coefficient after eight

weeks for 33 members of a normal male sample for Factor A and Factor H were .74 and .71 respectively (Buss, 1961).

Sex difference in aggressiveness and hostility were obtained with college students using a discriminant function analysis significant at 1% level, with males scoring higher for assault, suspicion, and verbal aggression. Also scores on Factor A and Factor H are unrelated to the socioeconomic class of the subjects or the age.

A field validation study was conducted to validate Buss-Durkee factors using 89 delinquent males of average age 14.53 and S.D. 1.31 (Edmunds and Kendrick, 1980). Each subject was rated on a five-point aggressiveness scale by three observers, two housemasters, and one class teacher. In order to improve the accuracy of rating, each subject for whom there was a discrepancy of two or more scale points between the ratings of the two housemasters or each subject for whom there was a discrepancy of 3.5 scale points between the two sets of ratings was discarded. Fourteen subjects were eliminated, and data from 75 subjects were analyzed. On the basis of the mean rating, the subjects were classified as high aggressive (HA) and low aggressive (LA), creating two delinquent groups of 36 subjects and 39 subjects. A nondelinquent control group of 38 subjects comparable in age (mean age 14.26), socioeconomic status, and IQ was also used. The three samples were given Buss-Durkee Factors A and H. The high aggressive

(HA) group scored high on both factors, but was significant only on Factor A supporting its validity.

In order to find out if the Buss-Durkee Inventory, "motor component" is valid for middle school children, it was administered to 20 students in a regular home room class at Mebane Middle School (12 girls and 8 boys ranging in age from 10.5 to 15 and IQ from 80 to 121), with an arithmetic mean of 26.13 for boys and 18.17 for girls, supporting the idea that there is a sex difference in aggression. Their arithmetic mean of aggression score (21.35) was lower than that of the sample (28.25) in the study, suggesting the validity of the instrument.

2. Torrance Test of Creative Thinking (TTCT), Verbal Form A, titled "Thinking Creatively with Words." The Torrance Tests of Creative Thinking are relatively free from racial and socio-economic bias, can be used cross culturally, are the most dependable measures of creative potentiality, and are applicable from kindergarten through graduate and professional school (Torrance, 1971, 1974).

Anderson and Stoffer (1977) used Figural and Verbal Forms of TTCT for delinquents on parole status and nondelinquent male adolescents from a high school population to determine their creative thinking abilities. They found that the nondelinquent group was significantly superior to the delinquent group in verbal creativity composite scores and on each of the verbal subscales of fluency, flexibility, and

originality. The results of this study supported the program of juvenile rehabilitation which promotes the expression of verbal creativity.

The Torrance Test of Creative Thinking, Verbal Form A, titled "Thinking Creatively with Words," consists of seven activities which can be rated for three components of creativity--fluency (number of relevant responses), flexibility (variety of categories), and originality (something unusual, remarkable, or surprising) (Torrance, 1974).

The test tasks selected for TTCT are believed to call into play different parts of a universe of abilities that may be conceptualized as creative thinking abilities (Torrance, 1974). To insure content validity, a consistent and deliberate effort was made to base the test stimuli, the test tasks, instructions, and scoring procedures on the best theory and research available. Analysis of the lives of indisputably eminent creative people have been considered in making decisions regarding the selection of tasks. A deliberate attempt was made to keep the test tasks free of technical or subject matter content.

For TTCT, the interscorer reliability of the scores, and intrascorer reliability were in excess of .90 for all variables (Torrance, 1974). The interscorer reliability was established by comparing the scoring with that of an experienced scorer; when there was no significant difference between the means of the two scores and when the coefficients of

reliability was in excess of .90, the scoring was considered reliable. The reliability coefficients of interscorers range from .86 to .99, and the average is .95. Also, the intra-scorer reliability coefficients have been consistently above .90 by the scorers rescoring a specific set of tests from time to time.

With a battery consisting of most of the tasks included in Verbal and Figural Forms A and B (Ask-and-Guess, Product Improvement, Unusual Uses, Incomplete Figures, and Circles), using 29 fifth grade children, Eherts (1961) obtained a test-retest reliability coefficient of .88 for fluency, flexibility, and originality battery total with 7 months interval.

In order to establish construct validity, Torrance (1962) made an analysis of the personality characteristics of the most creative boy and the most creative girl in each of 23 classes in grades one through six in three elementary schools. The controls were matched for sex, intelligence quotient, race, class (teacher), and age with the highly creative subjects. The criterion measure consisted of the composite scores on the Ask-and-Guess, Product Improvement, Consequences, Unusual Uses, Picture Construction, Incomplete Figures, and Circles Tests. Torrance also had available responses to the Draw-a-House-Tree-Person Test, a set of peer nominations on creativity criteria, and teacher nominations on similar criteria. On the basis of the statistical analysis of the comparison between the highly creative children and

their less creative controls, he found that three personality characteristics differentiated the highly creative subjects from their less creative controls. They were:

1. The highly creative children had a reputation for producing wild or silly ideas, especially the boys.
2. Their drawings and other productions were characterized by a high degree of originality.
3. Their productions are characterized by humor, playfulness, and relative relaxation.

Two sets of norm data are available, one on the fifth grade equivalency study sample and the other on college data, including both graduate students and undergraduate students (Torrance, 1974). The fifth grade data was used for converting the raw scores of elementary school children and high school students to T-scores, and the college data with college students and adults. T-scores are necessary to combine fluency, flexibility, and originality in order to make comparisons of relative strengths of individuals and groups.

#### Administration and Scoring of the Instruments

In the present study, TTCT (Verbal Form A) was first administered, followed by the Buss-Durkee Inventory, "motor component." TTCT was administered following the instructions given in the instructor's manual (Torrance, 1974). While administering the Buss-Durkee Inventory, the researcher read

the items aloud to the subjects. Also, subjects were free to ask for explanations if they did not understand the words, idioms, or expressions in the items.

TTCT (Verbal Form A) was scored by the Torrance Tests Scoring Service in Athens, Georgia, to avoid bias by the researcher in favor of expected results. The Buss-Durkee Inventory, "motor component" was scored using a hand key with a maximum expectancy of 43 points on aggression.

#### Treatment: Creative Problem-Solving

The methodology of Creative Problem-Solving as formulated by Osborn (1963) and Parnes (1967a) was used in the study. The researcher explained the concepts and terms related to Creative Problem-Solving and gave the subjects practice in brainstorming on the unusual uses of familiar objects. Further brainstorming practice was given on the familiar problem situations faced in school. A summary was given of Creative Problem-Solving steps, followed by a Creative Problem-Solving simulation in a story form. Finally, the subjects listed all the problems they face in school that make them angry. They picked three or four problems that make them very angry and found solutions following the steps of Creative Problem-Solving (See appendix for CPS outline).



### Collection of the Data

Seventeen emotionally handicapped children with aggression problems were identified by the special education teacher. Prior to the experiment, a pretest of creativity (TTCT, Verbal Form A) and the Buss-Durkee Inventory, "motor component" were administered to each of the 17 subjects. Then the subjects were randomly assigned into control and experimental groups using a random number table.

After the administration of pretests for all subjects, and randomization of subjects into control and experimental groups, the researcher worked with the experimental subjects, dispersed from the first period until the sixth period, on Creative Problem-Solving in small groups of two or three subjects, while the control subjects were engaged in routine special education class activities. The researcher used deception and told the control subjects that she could not work with all the subjects at the same time and so she would work with them later. The researcher worked with the experimental subjects on Creative Problem-Solving during special education period for 30 minutes daily for 15 consecutive sessions (3 weeks). The subjects were praised and reinforced at the end of each session for their performance and cooperation, as they were usually reinforced in the special education class. At the end of the 15 session treatment, TTCT (Verbal Form A) and the Buss-Durkee Inventory, "motor component" were readministered to both control and experimental subjects by the researcher.

### Statistical Procedure

In the present study, pretest-posttest scores of TTCT, Verbal Form A (creativity) and the Buss-Durkee Inventory, "motor component" (aggression) were collected. In order to increase the power of analysis and to control for any possible differences in initial levels of performance, an analysis of covariance (ANCOVA) was employed for the evaluation of differences between experimental and control groups on creativity and aggression using pretest scores as covariate (Rascoe, 1974). An analysis of covariance involves a pretest (the variable to be controlled called the "covariate") and posttest (the criterion or the dependent variable) that are to be correlated. A third variable of importance is the independent variable whose effects on the dependent variable is to be studied and is represented by membership in one of the experimental groups. In the present study, the same instrument was used for both pretest and posttest.

The analysis of covariance consists essentially of determining that a portion of the variance of the criterion existed prior to the experiment, and this portion is eliminated from the final analysis.

The predicted score is the portion of the criterion measure that may be determined from a knowledge of the variable to be controlled. This may be subtracted from the criterion score to obtain an adjusted criterion score. The final analysis was based on these adjusted scores and

statistical inferences were drawn with respect to adjusted group means. Thus ANCOVA is an analysis strategy in which posttest scores are adjusted on the means of pretest measures.

An analysis of covariance was done using:

1. The T-Score of creativity (three components combined);
2. The raw score of the three components of creativity--fluency, flexibility, and originality; and
3. The raw score of aggression.

In order to do the analysis of covariance, the following assumptions were made:

1. The sample populations (control and experimental groups) are normally distributed.
2. There is no interaction between treatment and the covariate.
3. The variance of the distribution of sample populations is homogeneous.
4. The correlation between the covariate and dependent variable is high enough to do ANCOVA.

The level of significance of the tests was set at .05 for creativity and .10 for aggression. The significance level of creativity was set at .05 to reduce Type I error. That is, the significance level of creativity was set at .05 to reduce the probability of rejecting the null hypothesis, by chance, when it is true. Thus a very strong test is used for creativity to see if the program is implemented. Studying the effectiveness of CPS on aggression was a new venture,

so the significance level of aggression was set at .10 to reduce Type II error. That is, the significance level of aggression was set at .10 to reduce the probability of retaining the null hypothesis by chance, when it is false.

## CHAPTER IV

### ANALYSIS OF THE DATA

The purpose of this study was to determine if training in Creative Problem-Solving could reduce the aggression of emotionally handicapped aggressive middle school children. For this purpose it was hypothesized that emotionally handicapped aggressive children would reduce their aggression through training in Creative Problem-Solving. To see if the program was implemented another hypothesis on creativity with three subproblems on the components of creativity (fluency, flexibility, and originality) were formulated. Pretests of creativity and aggression were administered to all subjects, followed by random assignment of subjects into control and experimental groups. Creative Problem-Solving training was given to the experimental subjects for 15 sessions of 30 minutes each. Posttests of creativity and aggression were administered to both control and experimental groups after the treatment period.

#### Results

Sixteen children participated in this study. The administration of the tests and the treatment were conducted according to the proceedings described in Chapter III, and

the data were analyzed using ANCOVA and the hypotheses were tested. In order to get total creativity for each subject, a T-Score was computed as suggested by Torrance (1974) and was used for the analysis. The use of a raw score is appropriate for pretest and posttest scores of the same individual on the components of creativity. To find the effectiveness of CPS on the components of creativity, the raw scores of the three components of creativity were analyzed. A summary of the mean and standard deviation of all variables for control and experimental groups are presented in Table 1.

When the differences in the means between the control and experimental groups on pre and posttest scores of total creativity, fluency, flexibility, originality, and aggression were compared, the effectiveness of CPS training was evident (Table 1). The difference between the means of control and experimental group for total creativity increased from 4.66 on the pretest to 16.03 on the posttest; for fluency, from 17.12 on the pretest to 41.13 on the posttest; for flexibility, from 8.50 on the pretest to 14 on the posttest; and for originality, from 15.50 on the pretest to 34.50 on the posttest, all in favor of the experimental group. The difference between the means of control and experimental group decreased on aggression from 3.75 on the pretest to 1.00 on the posttest in favor of the experimental group.

Prior to the analysis of covariance of the data, hypotheses of equal regression slopes were tested for the sample

Table 1  
Means and Standard Deviations of Control Group  
and Experimental Group on Pre and Posttests of the Variables--  
Total Creativity, Fluency, Flexibility, Originality, and Aggression

Variable	Control Group			Experimental Group		
	N	Mean	Standard Deviation	N	Mean	Standard Deviation
T-Score of Pre Total Creativity	8	42.47	3.59	8	47.13	4.39
T-Score of Post Total Creativity	8	36.34	4.13	8	52.37	10.68
Prefluency	8	37.63	16.99	8	54.75	22.64
Postfluency	8	37.25	11.63	8	78.38	30.54
Preflexibility	8	14.50	5.83	8	23.00	9.89
Postflexibility	8	15.13	5.94	8	29.13	14.56
Preoriginality	8	17.13	11.78	8	32.63	12.34
Postoriginality	8	15.88	8.53	8	49.38	24.47
Preaggression	8	27.00	4.10	8	30.75	4.33
Postaggression	8	27.00	3.69	8	26.00	4.66

populations involved to see if assumptions of the analysis of covariance were met. For total creativity an F value of .23 with P value of .64 was obtained; for fluency an F value of 1.45 with P value of .25 was obtained; for flexibility an F value of .00 with P value of .95 was obtained; for originality an F value of .56 with P value of .47 was obtained; and for aggression an F value of .19 with P value of .67 was obtained. Since the F values obtained were not significant, it was concluded that the assumption of homogeneity of the regression slopes was met for T-score of total creativity, and raw scores of fluency, flexibility, originality, and aggression at .05 level of confidence. Thus there was no interaction between the treatment and covariate, so it was appropriate to do the analysis of covariance.

In order to test the assumption of normality of the sample population involved in the study, plots of errors or residual versus predicted values of the dependent variable were plotted for T-Score of total creativity, the raw scores of fluency, flexibility, originality, and aggression. The data were found to be normally distributed on both sides of zero residual line, confirming that the normality assumption was met.

#### Hypotheses Tested

The analysis of covariance (ANCOVA) was employed to test the statistical hypotheses. The results are presented in Table 2.



Table 2

Analysis of Covariance for Total Creativity (T-score), Fluency (raw score), Flexibility (raw score), Originality (raw score), and Aggression (raw score)

Source of Variation	Total Creativity		Fluency		Flexibility		Originality		Aggression	
	F-Value	Significance of F	F-Value	Significance of F	F-Value	Significance of F	F-Value	Significance of F	F-Value	Significance of F
Model	14.20	.00	19.76	.00	5.96	.00	13.07	.00	3.90	.04
Group	6.89	.02	8.73	.01	2.06	.17	4.43	.05	3.26	.09
Covariate	6.54	.02	14.57	.00	4.15	.06	7.01	.02	7.30	.01

The null hypotheses tested by this procedure were as follows:

$H_{O_1}$ : Emotionally handicapped middle school children with aggression problems practicing Creative Problem-Solving technique manifest creativity as measured by the Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words") to the same degree as emotionally handicapped students with aggression problems not practicing the technique.

The analysis of covariance was applied to total creativity (T-Score) and the result is presented in Table 2. The computed  $F$  statistic for this hypothesis equalled 6.89. The probability of obtaining an  $F$  value under the null hypothesis equalled .02. Since the probability of the computed  $F$  statistic was less than the .05 level set as the criterion for statistical significance, the null hypothesis was rejected. That is, there was a significant difference in the adjusted average total creativity between the experimental and control groups. An inspection of the adjusted posttest means of total creativity in Table 3 indicated that the experimental group (49.65) had higher adjusted mean scores in total creativity compared to the control (39.06). The experimental group showed higher creativity than the control group. Thus it was concluded that emotionally handicapped middle school children who practiced Creative Problem-Solving increased their creativity significantly compared to those who did not practice Creative Problem-Solving.

Table 3  
Adjusted Posttest Means of Dependent Variables

Dependent Variable	Control	Group	Experimental
T-Score of Total Creativity (fluency, flexibility, and originality combined)	39.06		49.65
Fluency	44.44		71.19
Flexibility	17.99		26.26
Originality	22.84		42.41
Aggression	28.37		24.88

HO<sub>1(a)</sub>: Emotionally handicapped middle school children with aggression problems practicing Creative Problem-Solving technique manifest fluency as measured by the Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words") to the same degree as emotionally handicapped students with aggression problems not practicing the technique.

The analysis of covariance was applied to fluency (raw score), and the result is presented in Table 2. The computed F statistic for this hypothesis equalled 8.73. The probability of obtaining an F value under the null hypothesis equalled .01. Since the probability of the computed F statistic was less than the .05 level set as the criterion for statistical significance, the null hypothesis was rejected. That is, there was a significant difference in adjusted average fluency between the experimental and control groups. An inspection of the adjusted posttest means of fluency in Table 3 indicated that the experimental group (71.19) had higher adjusted mean scores in fluency compared to the control group (44.44). It was concluded that emotionally handicapped middle school children who practiced Creative Problem-Solving increased their fluency significantly compared to those who did not practice Creative Problem-Solving.

HO<sub>1(b)</sub>: Emotionally handicapped middle school children with aggression problems practicing the Creative Problem-Solving technique manifest flexibility as measured by the

Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words") to the same degree as emotionally handicapped students with aggression problems not practicing the technique.

The analysis of covariance was applied to flexibility (raw score) and the result is presented in Table 2. The computed  $F$  statistic for this hypothesis equalled 2.06. The probability of obtaining an  $F$  value under the null hypothesis equalled .17. Since the probability of the computed  $F$  statistic was greater than the .05 level set as the criterion for statistical significance, the null hypothesis was retained. That is, there was no significant difference in flexibility between the experimental and control groups. An inspection of the adjusted posttest means of flexibility in Table 3 indicated that the experimental group had higher adjusted mean scores in flexibility (26.26) compared to the control group (17.99), though it was not statistically significant.

$HO_{1(c)}$ : Emotionally handicapped middle school children with aggression problems practicing Creative Problem-Solving technique manifest originality as measured by the Torrance Test of Creative Thinking, (Verbal Form A, titled "Thinking Creatively with Words") to the same degree as emotionally handicapped students with aggression problems not practicing the technique.

The analysis of covariance was applied to originality (raw score) and the result is presented in Table 2. The

computed  $\underline{F}$  statistic for this hypothesis equalled 4.43. The probability of obtaining an  $\underline{F}$  value under the null hypothesis equalled .05. Since the probability of the computed  $\underline{F}$  statistic was equal to the .05 level set as the criterion for statistical significance, the null hypothesis was rejected. That is, there was a significant difference in originality between the experimental and control groups. An inspection of the adjusted posttest means of originality in Table 3 indicated that the experimental group (42.41) had higher adjusted mean scores in originality compared to the control group (22.84). Thus, it was concluded that emotionally handicapped middle school children who practiced Creative Problem-Solving increased their originality significantly when compared to those who did not practice Creative Problem-Solving.

HO<sub>2</sub>: Emotionally handicapped middle school children with aggression problems practicing Creative Problem-Solving technique manifest aggression as measured by the Buss-Durkee Inventory, "motor component" to the same degree as emotionally handicapped students with aggression problems not practicing the technique.

The analysis of covariance was applied to aggression (raw score) and the result is presented in Table 2. The computed  $\underline{F}$  statistic for this hypothesis equalled 3.26. The probability of obtaining an  $\underline{F}$  value under the null hypothesis equalled .09. Since the probability of the computed  $\underline{F}$

statistic was smaller than the .10 level set as the criterion for statistical significance, the null hypothesis was rejected. That is, there was a significant difference in aggression between the experimental and control groups. A summary of the adjusted posttest means of aggression is given in Table 3. An inspection of Table 3 indicates that the adjusted posttest mean scores of the experimental group (24.88) in aggression was less than that of the control group (28.37). It was concluded that emotionally handicapped middle school children with aggression problems practicing Creative Problem-Solving decrease their aggression significantly compared to those who do not practice Creative Problem-Solving.

#### Summary

Sixteen emotionally handicapped middle school children participated in this study. The Torrance Test of Creative Thinking, (Verbal Form A) and the Buss-Durkee Inventory, "motor component" were administered to the subjects prior to assigning them randomly into control and experimental groups. The researcher worked with the experimental groups on Creative Problem-Solving of the real problems they faced in school, in groups of two or three for 15 sessions, while the control subjects were engaged in their routine activities. Posttests of creativity and aggression were administered to both groups after the treatment period.

An analysis of covariance was employed to test the difference between experimental and control groups on creativity

and aggression with pretest scores as the covariate. Significant results were obtained for the total creativity, fluency, originality, and aggression. Results were non-significant for flexibility. Significance level was set at .05 for creativity in order to obtain a strong test for creativity to reduce Type I error. By setting the significance level for aggression at .10, caution was taken against Type II error without eliminating the new area of study (effectiveness of Creative Problem-Solving on aggression of emotionally handicapped children) from social science research.



## CHAPTER V

### DISCUSSION, IMPLICATIONS, PROBLEMS, RECOMMENDATIONS, SUMMARY, AND CONCLUSION

#### Discussion of the Results

The present study dealt with the problem of whether emotionally handicapped aggressive children would reduce aggression as a result of practice in Creative Problem-Solving by increasing creativity.

Hypothesis 1, that emotionally handicapped aggressive middle school children will increase creativity as a result of training in Creative Problem-Solving (CPS), was supported by the analysis of covariance of total creativity (T-Score) as measured by the Torrance Test of Creative Thinking, Verbal Form A ( $P < .05$ ). The significance level of creativity was set at .05 to keep the probability of a Type I error low. Thus there was a strong test for creativity to test the implementation of the program. The results obtained confirmed that significant difference was obtained in total creativity between control and experimental subjects.

Hypotheses 1a and 1c, that emotionally handicapped aggressive middle school children will increase their fluency and originality, were supported by the analysis of covariance of the raw scores of fluency and originality ( $P < .05$ ). That

is, the results obtained for fluency and originality showed that there was a significant difference between the control and experimental groups. The ability to produce a large number of ideas and the ability to produce ideas that are away from the obvious and common place increased significantly as a result of the training in CPS. Thus, CPS was found to be an effective tool to increase fluency and originality of emotionally handicapped middle school children.

Kandil and Torrance (1978) had found that emotionally handicapped children were high in their fluency and originality, but low in flexibility. The authors suggested that the subjects' strengths should be utilized in their special programs to remedy the deficit in the area of flexibility. The results of the program showed that the subjects' strong areas improved significantly due to practice in CPS. However, hypothesis 1b, that emotionally handicapped aggressive middle school children will increase flexibility, was not supported by the analysis of covariance of the raw scores, contrary to the suggestion of Kandil and Torrance (1978). There was no significant difference in flexibility score between control and experimental groups. That is, the subjects' ability to produce a variety of ideas, to shift from one approach to another, or to use a variety of strategies did not increase significantly by practice in CPS. However, an examination of the adjusted posttest means of flexibility suggested improvement for experimental group in flexibility, supporting the

view of Kandil and Torrance. It is possible that emotionally handicapped subjects needed more drill in making alternate responses to produce significant increase in flexibility. That is why precision teaching was used in their routine special education activities. The problem with the emotionally handicapped is that they are nonflexible in their ideas. They learned the habit of sticking to a narrow range of responses and a rigid pattern of thinking during their lifetime, and apparently it will take more than 15 training sessions to change their flexibility significantly.

Significant results obtained in hypothesis 1, 1a, and 1c are in agreement with several research findings that creativity increases with practice in Creative Problem-Solving. (Shean, 1979; Khatena, 1971; Sullivan, 1969; Torrance, 1964).

Hypothesis 2, that emotionally handicapped aggressive children practicing Creative Problem-Solving (CPS) will reduce their aggression, was supported by the analysis of covariance of the single index raw score obtained from the four subscales comprising the "motor component" of the Buss-Durkee Inventory ( $P < .10$ ). That is, significant difference was obtained in aggression between experimental and control groups supporting the hypothesis that training in CPS reduces aggression. This result is in agreement with the results of the studies of Loughmiller (1978), Robin et al. (1976), and Giebink et al. (1968) where aggression was reduced by cognitive

control technique in which problem-solving or alternate response was emphasized.

The significance level of aggression was set at .10 to reduce the probability of retaining the null hypothesis when it was false. Studying the effect of CPS on aggression of emotionally handicapped students is a new topic of interest and is a pioneer work in the area of developing a special program for the emotionally handicapped. Thus if CPS is effective in reducing aggression, its effects ought to be recognized by doing further studies in this area to help students who need special programs, hence the justification for setting the significance level of aggression at .10.

Edmunds and Kendrick (1980) believed that the Buss-Durkee Inventory used in this study to measure aggression is an excellent instrument, for it was constructed on the basis of theoretical principles, internal consistency, and factorial analysis. The social desirability variable was controlled by taking caution in the construction of each item. In the item construction, it was assumed that anger was present. So inquiry was made on how anger was expressed. Justification was provided for admitting aggressive acts, and familiar phrases and expressions were used. In the present study to test if social desirability was controlled, the arithmetic mean of the aggression score for the samples (28.25) used in the study was compared to that of the regular homeroom class (21.35) as measured by the Buss-Durkee Inventory, "motor

component". The mean aggression score of the subjects in the homeroom class was lower than that of the sample used in the study, supporting the validity of the instrument in identifying aggressive middle school children from less aggressive middle school children. The subjects were not hiding their aggression, and the evidence was in the results. However, the examination of the results obtained for aggression showed that it was significant only at .10 level of confidence, suggesting a need for some finer measure of aggression such as observation of the frequency counts of aggressive behavior (Kauffman, 1977) in the special education class where the treatment took place before and after the study.

One of the limitations of the study was that there were only 16 subjects. It is possible that the result for aggression was significant only at .10 level of confidence due to small sample size.

The Buss-Durkee factors were invariant for male subjects, but unstable for female students (Edmunds and Kendrick, 1980). The administration of the Buss-Durkee Inventory, "motor component" to the homeroom children showed an arithmetic mean of 26.13 for boys and 18.17 for girls supporting a sex difference in aggression. It might be possible that the presence of two female subjects in the control group might have affected the outcome of the study slightly resulting in lower level of confidence in aggression ( $P < .10$ ).

The arithmetic mean of the Buss-Durkee Inventory, 'motor component' for the homeroom children supported a sex difference in aggression (26.13 for boys and 18.17 for girls). Also Dalton (1973) used the Torrance Test of Creative Thinking and found a sex difference in favor of women on fluency, flexibility, and originality variables of creativity, suggesting a sex factor in creativity. The sex factor in creativity and aggression suggest future studies using males and females separately.

The researcher did not work with the control group on Creative Problem-Solving at the end of the experiment, though the subjects believed that she would work with them later, so the issue of Hawthorne effect may have been introduced. One might suspect whether the significant results on aggression were obtained due to CPS or to the attention the experimental subjects got from the researcher. There may be an attention effect, though the researcher believed that CPS was effective. Thus the study suggests that future research needs to have an attention control group.

In conclusion, the total creativity, fluency, and originality increased significantly at .05 level of confidence supporting the implementation of the program. In addition there was a significant difference between the control and experimental groups, and significant decrease for aggression. Thus, the validity of the treatment was supported.

### Problems the Researcher Faced

The emotionally handicapped aggressive subjects had had problems with the law or the school authorities previously, so they were afraid to sign any form or to get their parents to sign any form. The researcher had to assure them that their answers on the pre and posttests would be confidential, and that it would not get them into trouble.

The researcher had to have several extra copies of parent consent forms and child assent forms because some students had lost their copies. Sometimes they left their copy somewhere in the classroom or in their folder and forgot to show them to their parents when they were home. The researcher had to keep reminding the subjects to return the signed forms, had to inquire about the status of the unreturned forms from time to time, and had to replace the lost ones.

The emotionally handicapped subjects were frequently absent from school for various reasons--sickness, running away from home, broken bones, suspension from school, etc. When a member of the treatment group was absent from the session, the researcher had to keep note of what the subject missed and had to work with them separately to help them catch up with the rest of the small group they were part of. Thus absenteeism was a real problem the researcher had to face when working with groups of emotionally handicapped children. The researcher also had to work often with subjects

with broken bones and who were angry. Thus she had to use skill and patience to work with them.

Though the subjects were physically present, on some days they were not cooperative to work on Creative Problem-Solving. The problems the subjects faced in other classes were carried over to the special education class. In those cases also, the researcher had to help them on the parts they missed.

The researcher was always under the threat that the subjects in the study might be eliminated from the program due to suspension from school. One subject from the control group was suspended from school toward the end of the program, and was removed from the program.

The Creative Problem-Solving treatment was for three weeks (15 sessions). But the researcher had to spend seven weeks with the subjects at school from the time of the distribution of consent forms to the completion of the collection of the data. This was because the subjects were afraid to get the parent consent forms and child assent forms signed, and subsequent delay in returning the forms, and their absenteeism from class and lack of cooperation.

#### Recommendations for Future Research

Many questions came up as a result of the present study. Therefore, the following recommendations are made:



It would be beneficial to replicate the present experiment employing observational techniques and making a frequency count of the occurrence of the aggressive responses of the subjects during special education class, before and after the treatment adjunct to the Buss-Durkee Inventory, "motor component." The observational technique together with the paper and pencil test will strengthen the results of the study. .

Further research should be conducted using male and female samples separately because there is a sex factor in creativity in favor of females. Thus the sex of the participant could be a factor related to the efficiency of the Creative Problem-Solving.

Further research also should be conducted giving the subjects practice on Creative Problem-Solving for longer periods, to give them a thorough knowledge of the procedure of the technique especially on the alternate responses to increase flexibility significantly to draw stronger conclusions.

Since it was hard to keep even a small group of emotionally handicapped children on Creative Problem-Solving tasks, future research should be done using one subject at a time to get stronger results. It is costly to the schools or the agency involved to use emotionally handicapped aggressive subjects for CPS training on one-to-one basis. But it will pay off when the program is effective and the subjects cope with their frustrations and reduce aggression.

The study may be replicated using a larger sample to obtain stronger results.

Similarly, future research may be conducted using an experimental group, an attention control group, and a control group to see if the significant results obtained in this study is due to the treatment effect or to the attention the subjects obtained from the researcher.

Finally, a follow-up study may be conducted to find the duration of the effectiveness of the program on aggression. In order to do it, follow up the subjects (both control and experimental) in the study after a series of intervals and test them for creativity and aggression and see how long does the effectiveness of the program last.

#### Implications of the Study

The findings of this study have implications within the therapeutic milieu. Osborn's (1963) brainstorming process helped produce valuable ideas for solving problems. It not only produced ideas but also changed people's attitudes when they practiced the process repeatedly. Thus the subjects start appreciating and respecting their own well of knowledge. Because of this, psychologists are currently suggesting Creative Problem-Solving as an important part of therapy. The beginning of most cognitive therapy process is a simple generation of ideas. Even "well" people seem to be quite inhibited with regard to the free flow of ideas. Emotionally

disturbed children are low in their creativity to produce alternate original ideas, and they can get some therapeutic effect from the Creative Problem-Solving programs. Thus, this study has implications on the curriculum of special education class for the emotionally handicapped.

The results of the study also have implications for the training of teachers, counselors, and others who come into contact with children. Since Creative Problem-Solving was found to be effective in increasing creativity and reducing aggression of emotionally handicapped school children, one could help make changes in the curriculum of teachers' training programs by introducing required courses in creative thinking. Creativity courses may help teachers and counselors to be aware of their own creativity as well as that of their students, and thus be more effective in dealing with children. Teachers and counselors can use Creative Problem-Solving as an intervention program to teach children that there are alternate solutions to problems rather than aggression.

#### Summary

The present study was conducted to study the effectiveness of Creative Problem-Solving on aggression of emotionally handicapped middle school children by increasing creativity. The subjects were 16 aggressive children from a middle school attending special education class for the emotionally handicapped. Pretests of creativity (Torrance Test of Creative

Thinking, Verbal Form A) and aggression (The Buss-Durkee Inventory, "motor component") were administered to the subjects, followed by randomization of them into control and experimental groups. The researcher worked with the experimental subjects in groups of two to three for three weeks (15 sessions of 30 minutes each). They worked on the real problems they faced in school, following the steps of Creative Problem-Solving after the introduction of CPS concepts and a few warm up exercises. The control group was engaged in the routine precision learning of the special class. Tests of creativity and aggression were readministered to both control and experimental subjects following the treatment period.

The data collected were analyzed by the ANCOVA technique, using the pretests as covariates. The results showed that total creativity, fluency, and originality increased significantly at .05 level of confidence and aggression decreased significantly at .10 level of confidence, strengthening the relationship between creativity and aggression. Flexibility increased, but was nonsignificant. The significant level for creativity was set at .05 to get stronger results for creativity, in order to see if the program was implemented. The significant level for aggression was set at .10 because this was the first systematic study in which the effectiveness of CPS on aggression was studied and to avoid the possibility of throwing out the area by chance from future research if it was truly effective. The results supported the hypothesis

that training in Creative Problem-Solving increases creativity and decreases aggression, though flexibility did not increase significantly.

Because of the results obtained, it was recommended that future research be conducted, using a larger sample, using either males or females only, employing observational technique in addition to a paper and pencil test to measure aggression, giving more drill on CPS to find alternate responses as solutions to problems, and using an attention control group followed by a follow-up study to see how long the effects of treatment last on creativity and aggression.

### Conclusion

The results of the study showed that Creative Problem-Solving is an effective tool in reducing aggression. The results supported the view that creativity increases by practice. This study strengthened the relationship between creativity and aggression because increase in total creativity, fluency, and originality and decrease in aggression were significant. That is, increase in creativity is related to decrease in aggression.

The emotionally handicapped subjects are particularly low in their flexibility (Kandil and Torrance, 1978), and are low in their ability to solve problems by making alternate responses. Practice of Creative Problem-Solving

in this study increased the total creativity and the components, though flexibility was not significant. The non-significant result of flexibility would have been because of the short duration of CPS practice in the study. Perhaps, the emotionally handicapped children who learned the habit of aggressing physically and verbally, rather than making different categories of responses to solve their problems, need more practice to break from their habit. The training of Creative Problem-Solving in this study was only for three weeks (15 sessions of 30 minutes each), so training for a longer period (say, 30 sessions) might have increased the flexibility score significantly.

The study was conducted in April/May when the subjects were looking forward to the end of the school year. Also the temperature was hot during the time of the study, and it was hard on the subjects to work in their school building which was not air-conditioned. Therefore, the researcher believes that the subjects were not as responsive as they would have been during another time in the academic year.

By taking the obstacles in this study into account and looking at the results, one might conclude that the study was a success. It can, therefore, be concluded that training in Creative Problem-Solving is an effective tool in increasing the creativity and reducing the aggression of

emotionally handicapped aggressive middle school children when emphasis is on training that emphasizes other ways of handling problems.

## APPENDICES



APPENDIX A  
CREATIVE PROBLEM-SOLVING (CPS) PROGRAM OUTLINE

1st Session

Explanation of Words and Ideas Related to CPS (Show all underlined words and concepts on posterboards).

A problem may be defined as any need requiring action felt by individuals. (Give examples of problem to subjects).

E.g., 1: In the morning, when I am ready to go to school and if my car does not start, then I have a problem with my transportation. I have to find a way to get to school on time, that is, I have to find a solution to the problem.

E.g., 2: There is a particular parking lot where I can park my car at the University of Florida campus. If I go a few minutes after nine o'clock, that particular parking lot is full and so I do not get a place to park my car. Then I have a problem as I might get a ticket for parking my car elsewhere as I am allowed to park only in one particular parking lot.

E.g., 3: I set the alarm clock at night but it does not go off sometimes, and so I wake up late. I miss my eight o'clock class. Then I face a problem as I miss the lecture.

E.g., 4: Sometimes my children do not like the meals I cook for them. Then I face a problem.

Thus, I face a lot of problems at home and at school.

(Ask the subjects to give examples of problems they face).

Ask the subjects how do they feel when they face a problem.

rotten, frustrated, angry, aggressive, etc.

How do people show their anger or aggression?

Physical aggression - kicking, hitting, beating, slapping, spitting, biting, etc.

Verbal aggression - lying, gossiping, calling names, etc.

Everyone faces one problem or the other at home, at school, or at work. Then one has to do something about it. When we face a problem, instead of showing our aggression, we have to learn to solve the problem by making alternate responses that will reduce negative consequences and increase positive consequences. Negative consequences are bad results and positive consequences are good results.

## 2nd Session

### Creative Problem-Solving

When creativity or creative thinking is applied to problem-solving it is called Creative Problem-Solving. That is, a lot of imagination is used to find the best solution to the problems.

Creativity (Define): Ability to do something original or create something new.

Three parts of creativity:

fluency - number of ideas

flexibility - number of category of ideas

originality - uniqueness of ideas

Explain these three components of creativity on the basis of ideas produced for a familiar object, say a plastic container.

Inventors, famous writers, artists, painters, and architects show extreme degree of creativity, but creativity exists in all individuals. Creativity is expressed in a variety of ways. One can read, write, draw, cook, or decorate creatively. One can think creatively and solve a problem. Thus creativity can be expressed in all walks of life. (The researcher shows an example of her creative work to the children. For example, the researcher wanted to improve her candle making skill. She made different kinds of candles in different shapes, sizes, and colors and arranged them around a theme for presentation to her creative thinking course).

Ask the children to give an example of their creativity, something unique they produced or created.

## 3rd Session

Osborn's Brainstorming Rules

In Creative Problem-Solving idea production by brainstorming is recognized as the most important part. Brainstorming is a method to think up lots of quality ideas.

Explain Osborn's four simple "ground rules" for brainstorming.

1. Defer judgement. Criticism is ruled out.
2. Freewheeling is encouraged. Be a free-wheeler.
3. Quantity is wanted.
4. Combination and improvement are sought. Be a hitchhiker.

"Defer judgement" means postpone judgement or evaluation of ideas until later. Separate imagination and evaluation.

Hitchhiker is one who hitchhikes. To hitchhike while brainstorming means to combine ideas.

Freewheeler. To freewheel while brainstorming is to think up or imagine without any consideration of rules, forms, responsibilities, or consequences.

Quantity is number.

When practice in brainstorming is given, show Osborn's rules and idea spurring words on posterboards as shown on Worksheet No. 3. The researcher should encourage playfulness and informality. Invitation to regress should be extended saying that it is just for fun, not for grades. If the subjects "bog down", try some idea getting strategies such as

"Let's try to get our motor started again by getting more ideas".

Encourage them to combine ideas (hitch-hike).

Encourage them to give a new idea, preferably a wild one.

Let the researcher give an idea when the subject gives one idea or let the researcher give an idea when the subject gives two ideas.

Following the principles of brainstorming, give an exercise to brainstorm on a familiar object, e.g., write down the unusual uses of a paperclip. Let each subject hold the paper clip, manipulate it, and use all the senses while brainstorming.

#### 4th Session

Give more brainstorming practice on unusual uses of familiar objects following the "ground rules".

#### WORKSHEET NO. 1

LIST THE UNUSUAL USES OF THE FOLLOWING FAMILIAR OBJECTS:

(10 minutes each)

- |                |                |
|----------------|----------------|
| 1. A paperclip | 2. A newspaper |
| 3. A bottle    | 4. A tin can   |

#### 5th Session

In order to give more practice in brainstorming on real problems, take a pool of potentially frustrating situations

occurring at the school which are likely to lead to unacceptable aggressive behaviors. The situations selected here are adapted from the Aggression Inventory of Doyal (1976) as suggested by Giebink et al. (1968).

### WORKSHEET NO. 2

#### PRACTICE ON ADAPTIVE ALTERNATIVE RESPONSES TO PROBLEMATIC SITUATIONS THROUGH BRAINSTORMING

Example 1. Suppose the teacher enters the room to find it noisy. You were not one of the noisy people. But the teacher makes everyone do a task 100 times as the punishment. You are angry. How would you react to this situation? Generate alternate adaptive response ideas to solve this problem situation (10 minutes).

(Gave space to list the responses)

Example 2. Suppose you are eating your lunch and someone accidentally spills your soup all over your sandwich and makes you angry. What would you do? Generate all possible ideas to solve this problem (10 minutes).

(Gave space to list the responses)

Example 3. Someone wrote a dirty word on the bathroom wall and the classmates blame you and the teacher sends you to the principal's office for a spanking. You are angry. Generate alternate adaptive ideas to solve this problem (10 minutes).

(Gave space to list the responses)

#### 6th and 7th Session

##### Creative Problem-Solving Process Summary

Introduce Creative Problem-Solving (CPS) summary in a diagrammatic way. Explain the steps of CPS and the component skills involved. (Show the figural representation of Creative

Problem-Solving process, Osborn's principles and idea spurring words on posterboards.)

## 8th Session

### Creative Problem-Solving Simulation

The children listened to a CPS simulation developed in a story form. The researcher read the story to the subjects while the subjects read the story silently.

In order to introduce a simulation of Creative Problem-Solving technique a story is depicted as follows:

The experimental subjects listened to a story of a middle school student named Robby who reduced his aggression by practicing Creative Problem-Solving (CPS).

Once there was a student named Robby. He fought with his classmates, talked back to the teachers and got into trouble. He was sent to the counselor and to the principal several times because he could not control his aggression. At times he was angry at his classmates, his teachers, and others. He could not explain what was bothering him. He was in a mess. So, he was put in a special class where he got some practice in Creative Problem-Solving daily. He followed the five steps in CPS, one after another, emphasizing the principle of deferred judgement of brainstorming at each step. The five steps of CPS are:

1. Fact-finding
2. Problem-finding

3. Idea-finding
4. Solution-finding, and
5. Acceptance-finding

In order to find facts, Robby asked himself the following questions:

1. What is bugging me?
2. Who has been on my mind? teachers, classmates or others? Why?
3. What sort of conflict have I got on my mind?
4. What is a goal I would like to attain this year, this month, or this day? For example, can I get good grades this term?
5. What is bothering me in my relationship with my teachers and classmates at school?

In Problem-finding Robby was asked to generate a list of problems. He was given 10 minutes to write down the following problems without judging:

1. My classmates tease me and fight with me.
2. I am not popular among my classmates.
3. I have problems with my school work. I lose my worksheets.
4. I find it difficult to get good grades. (I make poor grades).
5. I become tardy in school.
6. I fall asleep in class.
7. I get into trouble with teachers and classmates.



8. I forget to bring my homework.
9. I do not complete my homework.
10. Someone breaks into my locker often.
11. I get my things stolen (books, pencils, backpack, cap, etc.).
12. I get suspended from school often.

Then, Robby was asked to pick the problem that makes him very, very angry at school. He picked problem No. 7 and circled it. He reworded and redefined the problem as follows for creative attack setting time limits. So, he asked the following open-ended question:

"In What Ways Might I improve my relationship at school?"

He could substitute the different words and change the problem.

Improve		Promote
-----		-----
Develop		Better

school		classroom
-----		-----
lunch- room		playground

quarter		semester
-----		-----
month		year

At school can be changed  
to teachers and classmates.

"In What Ways Might I develop better relationship in school?"

OR

"In What Ways Might I promote better relationship in school?"

OR

"In What Ways Might I improve my relationship in school?"

OR

"In What Ways Might I improve my relationship with my teacher and classmates?"

OR

"In What Ways Might I improve my relationship with my teachers and classmates during this year?"

OR

"In What Ways Might I improve my relationship with my teachers and classmates during this semester or quarter?"

OR

"In What Ways Might I improve my relationship with my teachers and classmates during this month?"

OR

"In What Ways Might I improve my relationship with my teachers and classmates in the lunchroom?"

OR

"In What Ways Might I improve my relationship with my teachers and classmates in the playground?" etc.

Thus the reworded question for creative attack is "IN WHAT WAYS MIGHT I IMPROVE MY RELATIONSHIP WITH MY TEACHERS AND CLASSMATES DURING THIS QUARTER?"

Robby looked at the problem and broke the problem into subproblems.

1. "In What Ways Might I improve my relationship with my teacher during this quarter?"

2. "In What Ways Might I improve my relationship with my classmates during this quarter?"

At first Robby took subproblem No. 1 and generated ideas by brainstorming technique (10 minutes) as follows:

1. Do my homework and classwork well.
2. Be seated in chair without disturbing neighbors.
3. Complain about the teacher.
4. Bribe the teacher (give an apple to the teacher).
5. Have a conference with the teacher to find out how

I could improve my relationship with her.

Next, Robby moved into the Criteria-finding state. He made a list of criteria to evaluate the ideas produced based on consequences. They are as follows:

1. Is the idea useful?
2. Is the idea an improvement?
3. Is the idea timely?
4. Is the idea efficient?
5. Is the idea simple enough to implement? That is, is the idea practical?
6. Is the idea within my budget? That is, is it costly?
7. Will this idea make me happy, etc.?

Robby picked four criteria appropriate for his subproblem and circled them. Then he evaluated each idea he produced against those four criteria using a three point scale where 1 equals poor, 2 equals fair, and 3 equals good.

	Is the idea an improve- ment?	Is the idea timely? (time spent)	Is the idea simple enough to be imple- mented?	Will this idea make me happy?	Sum Scores
1. Do my work well.	3	3	1	2	9
2. Be seated without bothering others.	3	3	2	2	10
3. Complain about the teacher.	1	3	1	1	6
4. Bribe the teacher.	1	2	1	1	5
5. Have conference with teacher.	3	3	3	2	11

Robby picked the ideas which scored 9 points or higher. Also, he combined some ideas.

Robby decided to do his school work without disturbing others. Also, Robby decided to have a conference with the teacher to find out ways to improve his relationship with the teacher.

Robby had to find acceptance for his solution to the problem. So, he had to find out to whom he will sell the program, when, where, and how? Robby had conflict with his teacher and so he found out criteria to sell his decision or solution to his teachers and other authorities in the school. His criteria for implementing his plan or selling his plan are as follows:

1. Will the solution to my problem make my teacher happy?

2. Will my counselors and principal be happy?

3. Is it possible to implement it within the time limit, that is, within this quarter?

Next evaluate the two solutions selected against the criteria using a three point scale where 1 equals poor, 2 equals fair and 3 equals good.

	Will my teachers be happy?	Will the principal and counselor be happy?	Will I be able to im- plement it this quarter?	Sum Scores
1. Do the school work without disturbing others.	3	3	3	9
-----				
2. Have a conference with the teacher.	3	3	3	9
-----				

Robby combined and summarized the solution to the problem. ROBBY DECIDED TO HAVE A CONFERENCE WITH THE TEACHER TO IMPROVE HIS RELATIONSHIP WITH THE TEACHER AND DECIDED TO WORK HARD AND BEHAVE WELL IN SCHOOL.

Robby communicated his decision with the teacher. The teacher was happy and so was Robby. He did not get into trouble with the teacher anymore and he could control his aggression.

Similarly Robby took the second subproblem, "In What Ways Might I improve my relationship with my classmates during this quarter?" for creative attack and found solution to his problem and adjusted well.

9th, 10th and 11th Session

Creative Problem-Solving of Real Problems

Give the subjects practice to go through a real problem that makes them angry at school following the steps of CPS after they list all the problems they face in school on the front page of worksheet handed out. (Worksheet No. 3)

12th to 15th Session

Practice in Creative Problem-Solving of Real Problems

(continued)

Give practice on at least two more real problems that make them angry using the steps in CPS. Children worked on their own problems they brainstormed on Worksheet No. 3.

## WORKSHEET NO. 3

CREATIVE PROBLEM-SOLVING (Adapted from the handout given by E. Paul Torrance and Pansy Torrance in the Creative Thinking course at the University of Georgia, Athens, Ga.)

IN THE SPACE BELOW, LIST AS RAPIDLY AS POSSIBLE PROBLEMS THAT FACE YOU RIGHT NOW IN SCHOOL THAT MAKE YOU ANGRY. JUST LIST THEM NOW. YOU WILL BE WORKING WITH SOME OF THESE DURING THE NEXT PERIODS.

(Words to increase your sensitivity to problems are: improvements? goals? transportation? friends? teachers? grades? appearance? personality? safety? meals? personal things? (15 minutes to list the problems)

Gave Space

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CPS FLOWSHEET SHOWING 5 STEPS

F-F → P-F → I-F → S-F → A-F → Plan

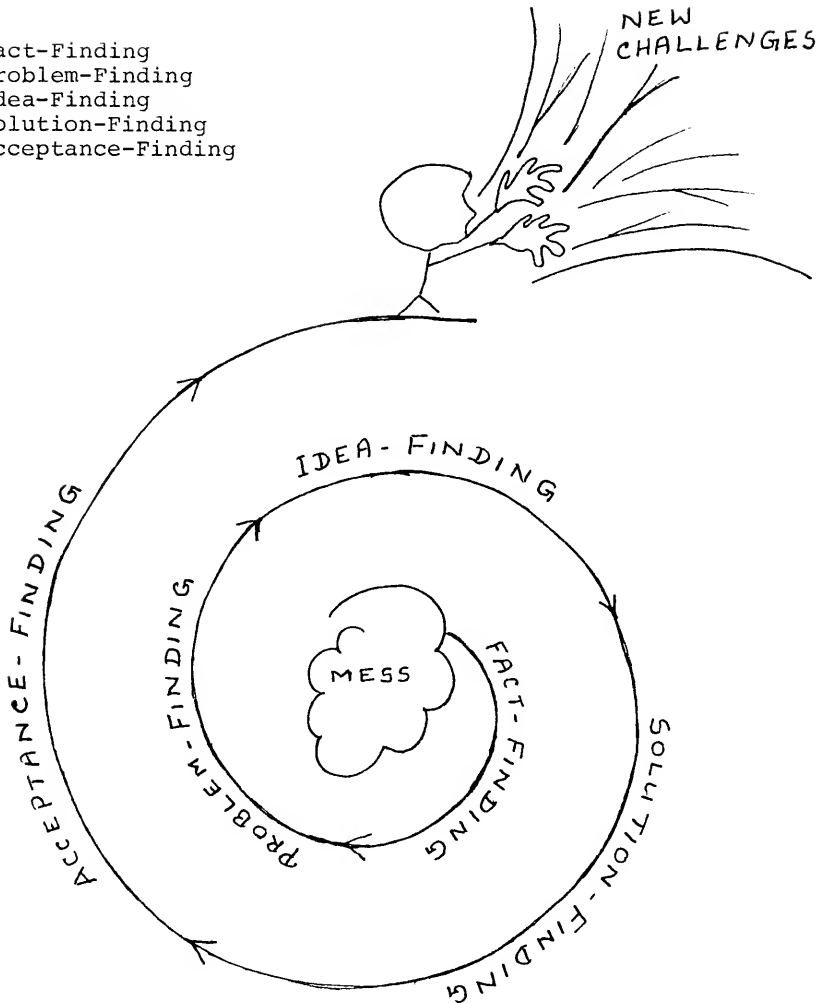
CREATIVE PROBLEM-SOLVING  
COMPONENT SKILLS:

1. PROBLEM DEFINITION
  2. BRAINSTORMING
  3. CRITERIA SELECTION
  4. EVALUATION OF IDEAS
  5. PREPARATION OF SELLING PROGRAM
-

## Program Summary

## CREATIVE PROBLEM-SOLVING PROCESS

Fact-Finding  
Problem-Finding  
Idea-Finding  
Solution-Finding  
Acceptance-Finding



Typical Flow of the Creative Problem-Solving Process. Used by permission from S.J. Parnes, Creative Behavior Workbook. New York: Charles Scribner's Sons, 1967b.

---



LOOK AGAIN AT FRONT PAGE WHERE YOU LISTED YOUR PROBLEMS. CHOOSE THE PROBLEM WHICH MAKES YOU VERY ANGRY AND WORD IT FOR CREATIVE ATTACK. THEN LIST AT LEAST 5 QUESTIONS ABOUT THE PROBLEM TO FIND FACTS. TURN THE PROBLEM AROUND, UPSIDE DOWN, INSIDE OUT. ADD ENOUGH FACTS TO MAKE THE PROBLEM CLEAR.

Gave Space

---

### PROBLEM-FINDING

#### REDEFINITION:

USING THE IDEAS YOU OBTAINED IN THE CPS SESSIONS RE-DEFINE THE PROBLEM YOU ARE WORKING ON. REDEFINE THE PROBLEM USING THE FORM "IN WHAT WAYS MIGHT I.....?"

STATEMENT 1.

Gave Space

STATEMENT 2. (After Rearrangement of words in the original statement)

Gave Space

---

BREAK THE PROBLEM INTO SUB-PROBLEMS IF NEEDED AND WRITE THEM IN THE SPACE BELOW.

Subproblem 1.

Gave Space

Subproblem 2.

Gave Space

Subproblem 3.

Gave Space

---

## BRAINSTORMING

## Osborn's (1963) Four Basic Rules

1. CRITICISM IS RULED OUT.  
Defer judgement until later. (That is, imagination and judgement are separated).
2. "FREE-WHEELING" IS WELCOMED.  
The wilder the idea, the better; it is easier to "tame down" than to think up.
3. QUANTITY IS WANTED.  
The greater the number of ideas, the better are the chance to produce good ideas.
4. COMBINATION AND IMPROVEMENT ARE SOUGHT.  
Combine two or more ideas. Be a "hitch-hiker."

A list of idea spurring words can be used to enlarge the storehouse of ideas (Noller, Treffinger, and Houseman, 1979, p. 35)

## IDEA SPURRING WORDS:

- S - Substitute (material, place, name, time, color, function, etc.)
  - C - Combine (unite, join, embody, assimilate, blend, etc.)
  - A - Adapt, add (conform, regulate, adjust, etc.)
  - M - Modify (transform, alter, vary, moderate, etc.)  
Magnify (add, larger, multiply, stronger, etc.)  
Minify (subtract, divide, smaller, etc.)
  - P - Put to other uses (altered, reversed, etc.)
  - E - Eliminate (remove, omit, cut out, etc.)
  - R - Reverse (invert, opposites, backward, inside out, upside down)  
Rearrange (change order or adjust component parts, how else use, etc.)
-

## IDEA-FINDING

WRITE ALL YOUR IDEAS THAT ARE SOLUTIONS TO YOUR PROBLEM. (10 minutes) (READ PAGE 7 CAREFULLY BEFORE IDEA PRODUCTION AND FOLLOW THE RULES OF OSBORN).

Gave Space

-----

## SOLUTION-FINDING

EVALUATING IDEAS: Two things are needed: Ideas to evaluate, and criteria to weigh or measure the ideas with.

Criterion: A yardstick, a standard of judging. Each and Every idea is judged by ONE criterion, then one moves to the second criterion to judge all ideas, etc.

FROM THE IDEAS YOU BRAINSTORMED FOR YOUR OWN PROBLEM YOU FACE IN SCHOOL, DEVELOP THE KIND OF CRITERIA YOU NEED TO WEIGH OR MEASURE (the yardstick you will use). GENERATE CRITERIA BY BRAINSTORMING. CIRCLE FIVE CRITERIA MOST PERTINENT TO THIS PARTICULAR PROBLEM.

-----

1. Criteria are in the vertical columns. Ideas are in the horizontal columns.

2. Weigh all ideas, one by one, by just ONE criterion. DO NOT go across the page, go vertically. G is good or 3; F is fair or 2; P is poor or 1.

EVALUATION MATRIX

CRITERIA

Ideas below

1.

2.

3.

4.

5.

6.

7.

8.

SUM THE SCORES OBTAINED FOR EACH IDEA ACROSS THE PAGE.  
CHOOSE THE THREE BEST IDEAS AND LIST THE WAYS YOU COULD SELL  
THEM--TO WHOM, HOW, WHEN, WHERE, ETC.?

---

ACCEPTANCE-FINDING  
SELLING THE IDEA

Brainstormed ideas for selling.

LIST THE WAYS YOU COULD SELL THE IDEA.

TO WHOM?

HOW?

WHEN?

WHY?

Evaluation of selling ideas using criteria:

Ideas

Criteria

1.

2.

3.

SELECT THE BEST IDEA. COMBINE THE IDEAS IF THEY ARE EQUALLY GOOD.

---

STATEMENT OF THE PROBLEM FROM THE FUZZY SITUATION AND YOUR PLAN FOR ITS SOLUTION.

(A brief summary)

Gave Space

---

## APPENDIX B

### THE BUSS-DURKEE INVENTORY "MOTOR COMPONENT"

- |   |     |
|---|-----|
| 1. I seldom strike back, even if someone hits me first. -----               | T F |
| 2. I sometimes spread gossip about people I don't like. -----               | T F |
| 3. I lose my temper easily but get over it quickly. -----                   | T F |
| 4. When I disapprove of my friend's behavior, I let them know it. -----     | T F |
| 5. Once in a while I cannot control my urge to harm others. -----           | T F |
| 6. I never get mad enough to throw things. -----                            | T F |
| 7. Sometimes people bother me just by being around. --                      | T F |
| 8. I often find myself disagreeing with people. --                          | T F |
| 9. I can think of no good reason for hitting anyone. -----                  | T F |
| 10. When I am angry, I sometimes sulk. -----                                | T F |
| 11. I am irritated a great deal more than people are aware of. -----        | T F |
| 12. I can't help getting into arguments when people disagree with me. ----- | T F |
| 13. If someone hits me first, I let him have it. --                         | T F |
| 14. When I am mad, I sometimes slam doors. -----                            | T F |
| 15. I am always patient with others. -----                                  | T F |
| 16. I demand that people respect my rights. -----                           | T F |
| 17. Whoever insults me or my family is asking for a fight. -----            | T F |

18. I never play practical jokes. ----- T F
19. It makes my blood boil to have somebody make fun  
of me. ----- T F
20. Even when my anger is aroused, I don't use "strong  
language". ----- T F
21. People who continually pester me are asking for  
a punch in the nose. ----- T F
22. I sometimes pout when I don't get my own way. --- T F
23. If somebody annoys me, I am apt to tell him what  
I think of him. ----- T F
24. I often feel like a powder keg ready to explode. T F
25. When people yell at me, I yell back. ----- T F
26. When I really lose my temper, I am capable of  
slapping someone. ----- T F
27. Since the age of ten, I have never had a temper  
tantrum. ----- T F
28. When I get mad, I say nasty things. ----- T F
29. I sometimes carry a chip on my shoulders. ----- T F
30. I could not put someone in his place, even if he  
needed it. ----- T F
31. I get into fights about as often as the next  
person. ----- T F
32. I can remember being so angry that I picked up  
the nearest thing and broke it. ----- T F
33. I often make threats I don't really mean to carry  
out. ----- T F
34. I can't help being a little rude to people I  
don't like. ----- T F
35. I generally cover up my poor opinion of others. - T F
36. If I have to resort to physical violence to  
defend my rights, I will. ----- T F
37. If someone doesn't treat me right, I don't let  
it annoy me. ----- T F

38. When arguing, I tend to raise my voice. ----- T F
39. I have known people who pushed me so far that  
we came to blows. ----- T F
40. I don't let a lot of unimportant things irritate  
me. ----- T F
41. Lately, I have been kind of grouchy. ----- T F
42. I would rather concede a point than get into an  
argument. ----- T F
43. I sometimes show my anger by banging on the  
table. ----- T F



## APPENDIX C

### PARENT INFORMED CONSENT

PROJECT: Training in Creative Problem-Solving

Dear Parent:

I have been given permission to conduct a study in your child's special education class. I am interested in helping children learn to deal with problem situations. I would like your permission for your child to participate in a Creative Problem-Solving training program that I have developed to help children solve problems.

Your child will participate in the program for 30 minutes during special education period daily for three weeks (15 sessions). I will give them some tests before and after the program. I will explain the steps in Creative Problem-Solving and will show the procedure in a story form. Next, your child will try to use the method to find solutions to adjust to problem situations.

There is no known physical or psychological harm in this process. You may withdraw your permission for your child's participation at any time. I will ask the school for your child's date of birth and IQ scores. Your child's identity will be kept confidential within legal limits.

A copy of this study is available at the school. There is no monetary compensation for participation in the study.

Your cooperation and that of your child can be very helpful for the study to help children adjust better by practicing Creative Problem-Solving.

Please indicate your answer below, sign, and return this form with your child tomorrow. A copy of this consent form will be returned to you.

Thank you very much for your assistance.

Sincerely,

-----  
I have read and understood the procedure described above. I give permission for my child, \_\_\_\_\_ to participate in the procedure.

Signatures: Parent \_\_\_\_\_ Date \_\_\_\_\_  
Witness \_\_\_\_\_ Date \_\_\_\_\_  
Researcher \_\_\_\_\_ Date \_\_\_\_\_

If you have any question you may call

Saramma T. Mathew  
Principal Investigator  
392-0723 or 392-0725

APPENDIX D

CHILD ASSENT FORM

PROJECT: Training in Creative Problem-Solving

The present study is set up so that you will learn creative ways to deal with problem situations. You will leave your special education class for 30 minutes each day for three weeks to study Creative Problem-Solving. Before the program starts an instructor will give you some tests. Then the instructor will talk with you about Creative Problem-Solving and will explain the steps one by one. You will listen to a Creative Problem-Solving procedure in a story form. Next, you will try to use the method to find solutions to adjust to problem situations you face. Finally, the instructor will give you tests to see your improvements.

Your participation in the study will help educators to plan your program.

You may stop being in the program at any time that you would like.

If you have any questions about the study, please call:

Saramma T. Mathew

392-0723 or 392-0725

"I have read and understood the procedure described above. I agree to participate in the procedure and I have received a copy of this description."

Signatures:	_____	_____	_____	_____
	Subject	Date	Witness	Date
Relationship if other	_____	_____	Principal	_____
than subject		Date	Investigator	Date
			1403 Norman Hall	
			College of Ed.,	
			Univ. of Fl.,	
			Gainesville, Fl.	

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### BIOGRAPHICAL SKETCH

Mrs. Saramma Thomas Mathew was born on June 6, 1938, at Kuriyannoor, Kerala, India, as the eldest of four children. She attended the C.M.S. School at Kuzhikala and graduated with honors from high school in 1954. She attended H.H. The Maharaja's College for Women, Trivandrum, Kerala, and received, with honors, a Bachelor of Science degree with zoology and chemistry as her elective subjects. In 1958, she went to Hawabagh Teachers' Training College for Women, Jabalpur, M.P., India, and received the Bachelor of Teaching degree, also with honors, in 1959.

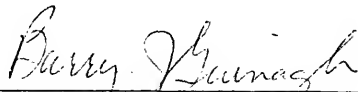
From 1959 to 1963 she worked as a teacher in Kerala, India, first in Padmanabhodayam Basic Training School, Mezhuveli, and later in the Kerala education system of the Public Service Commission at the high school level. Between 1965 and 1976, she worked in George Washington University, Vanderbilt University, and University of Georgia as a research assistant. She also taught as a part-time instructor at Piedmont College and Truett-McConnell College in Georgia.

In 1968, she received a Master of Arts degree in education from Howard University, Washington, D.C. She did further graduate studies in the University of Georgia, and in Fall 1977 she began a graduate study in the department of

Foundations of Education, University of Florida, where she also worked as a graduate assistant.

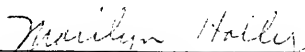
Mrs. Mathew is a member of Kappa Delta Pi, American Association of University Women, and John Dewey Society. She is married to Dr. Tom Mathew, and they have three children--two boys and a girl.

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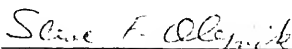
Barry J. Guinagh, Chairman  
Associate Professor of  
Foundations of Education

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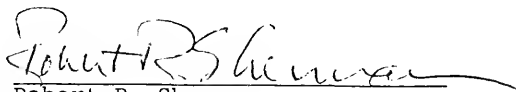
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This dissertation was submitted to the Graduate Faculty of the Department of Foundations of Education in the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 1981



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